IN TWO SECTIONS—PART I

NATURE · EVOLUTION · CONSERVATION

NATURAL HISTORY

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INVERTEBRATE ZOOLOGY · ANTHROPOLOGY · PHYSIOLOGY · EDUCATION

GEOLOGY · MINERALOGY · PALAEONTOLOGY · MAMMALOGY · ORNITHOLOGY

THEODORE ROOSEVELT
IN MEMORIAM

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BY EDWIN GRANT CONKLIN

BIRDS OF LOUISIANA

DISCUSSION OF THEIR PROTECTION AND HABITS, WITH MANY REMARKABLE PHOTOGRAPHS IN DUOTONE

JOURNAL OF THE AMERICAN MUSEUM OF NATURAL HISTORY

ENTOMOLOGY · ICHTHYOLOGY · HERPETOLOGY

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The American Museum of Natural History

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Courtesy of Underwood and Underwood

HIS FORCE SEEMED TO INCARNATE THE SOUL OF AMERICA

The energy and latent action, the rational thought, the controlled will, the moral force—that was Theodore Roosevelt (1858–1919)

He denied himself all things that weaken. He gave his life to work and to whatever circumstances brought in the way of private and public duty and private and public fellowship. "Work, duty, and fellowship"—he preached them and lived them with the zeal of a prophet, and they pretty much make the message he leaves us: "work" and "duty," the basis of moral force in man or nation, the iron qualities on which the United States were founded; "fellowship," a key to an understanding of our neighbor and a melting pot for class differences. He believed in the "joy" of life also, but not merely the old primeval heritage, and never pleasure sought as such, but, instead, that achievement which comes as a by-product of work faithfully done, lack of self-seeking, trust in the good in one's fellow men, and knowledge of nature

NATURAL HISTORY

VOLUME XIX JANUARY, 1919 NUMBER 1

Theodore Roosevelt[1]

HIS AMERICANISM REACHED IN TO THE MARROW OF HIS BONES

By JOHN BURROUGHS

NEVER before in my life has it been so hard for me to accept the death of any man as it has been for me to accept the death of Theodore Roosevelt. I think I must have unconsciously felt that his power to live was unconquerable. Such unbounded energy and vitality impressed one like the perennial forces of nature. I cannot associate the thought of death with him. He always seemed to have an unlimited reserve of health and power. Apparently he cared no more for the bullet which that would-be assassin shot into his breast a few years ago than for a fleabite.

From his ranch days in Montana to the past year or two I saw and was with him many times in many places. In the Yellowstone Park in the spring of 1903, in his retreat in the woods of Virginia during the last term of his presidency, at Oyster Bay at various times, in Washington at the White House, and at my place on the Hudson, I have felt the arousing and stimulating impact of his wonderful personality. When he came into the room it was as if a strong wind had blown the door open. You felt his radiant energy before he got halfway up the stairs.

When we went birding together it was ostensibly as teacher and pupil, but it often turned out that the teacher got as many lessons as he gave.

Early in May, during the last term of his presidency, he asked me to go with him to his retreat in the woods of Virginia, called "Pine Knot," and help him name his birds. Together we identified more than seventy-five species of birds and wild fowl. He knew them all but two, and I knew them all but two. He taught me Bewick's wren and one of the rarer warblers, and I taught him the swamp sparrow and the pine warbler. A few days before he had seen Lincoln's sparrow in an old weedy field. On Sunday after church, he took me there and we loitered around for an hour, but the sparrow did not appear. Had he found this bird again, he would have been one ahead of me. The one subject I do know, and ought to know, is the birds. It has been one of the main studies of a long life. He knew the subject as well as I did, while he knew with the same thoroughness scores of other subjects of which I am entirely ignorant.

He was a naturalist on the broadest grounds, uniting much technical knowledge with knowledge of the daily lives and habits of all forms of wild life. He probably knew tenfold more natural history than all the presidents who had preceded him, and, I think one is safe in saying, more human history also.

In the Yellowstone Park when I was with him, he carried no gun, but one

[1] This article, in part, was read before the Roosevelt Memorial Meeting at the Century Club, New York City, February 9, by Major George Haven Putnam

day as we were riding along, he saw a live mouse on the ground beside the road. He instantly jumped out of the sleigh and caught the mouse in his hands; and that afternoon he skinned it and prepared it in the approved taxidermist's way, and sent it to the United States National Museum in Washington. It proved to be a species new to the Park.

In looking over the many letters I have had from him, first and last, I find that the greater number of them are taken up with the discussion of natural history problems, such as Darwin's theory of natural selection, "sports," protective coloration. He would not allow himself, nor would he permit others to dogmatize about nature. He knew how infinitely various are her moods and ways, and not infrequently did he take me to task for being too sweeping in my statements.

When, in the early part of the last decade, while he was President, there was a serious outbreak of nature-faking in books and in various weekly and monthly periodicals, Roosevelt joined me and others in a crusade against the fakers and wielded the "big stick" with deadly effect. He detected a sham naturalist as quickly as he did a trading politician.

Roosevelt was much amused by the change that had come over the spirit of that terrible beast, the grizzly bear in Yellowstone Park. In a letter to me he comments as follows:

WHITE HOUSE, WASHINGTON
August 12, 1904

DEAR OOM JOHN,

I think that nothing is more amusing and interesting than the development of the changes made in wild beast character by the wholly unprecedented course of things in the Yellowstone Park. I have just had a letter from Buffalo Jones, describing his experiences in trying to get tin cans off the feet of the bears in the Yellowstone Park. There are lots of tin cans in the garbage heaps which the bears muss over, and it has now become fairly common for a bear to get his paw so caught in a tin can that he cannot get it off and of course great pain and injury follow. Buffalo Jones was sent with another scout to capture, tie up and cure these bears. He roped two and got the can off of one, but the other tore himself loose, can and all, and escaped. . . .

Think of the grizzly bear of the early Rocky Mountain hunters and explorers, and then think of the fact that part of the recognized duties of the scouts in the Yellowstone Park at this moment is to catch this same grizzly bear and remove tin cans from the bear's paws in the bear's interest!

The grounds of the White House are lovely now, and the most decorative birds in them are some red-headed woodpeckers.

Give my regards to Mrs. Burroughs. How I wish I could see you at Slabsides! But of course this summer there is no chance of that.

Always yours,

[Signed] THEODORE ROOSEVELT.

Roosevelt was a many-sided man and every side was like an electric battery. Such versatility, such vitality, such thoroughness, such copiousness, have rarely been united in one man. He was not only a full man, he was also a ready man and an exact man. He could bring all his vast resources of power and knowledge to bear upon a given subject instantly.

Courageous, confident, self-assertive, he was yet singularly tender and sympathetic. He was an autocratic democrat. "Hail fellow well met" with teamsters, mechanics, and cowboys, he could meet kings and emperors on their own ground. A lover of big-game hunting, he was a naturalist before he was a sportsman.

His Americanism reached in to the marrow of his bones. I could never get him interested in that other great American,—one more strictly of the people than he was—Walt Whitman. Whitman's democracy was too rank and unrelieved to attract him. The Rooseveltian strenuousness and austerity and high social ideals stood in the way.

Roosevelt combined and harmonized opposite qualities. Never have I known such good-fellowship joined to such austerity, such moral courage to such physical courage, such prodigious powers of memory united with such powers of original thought. He could face a charging lion, or a grizzly bear, as coolly as he could an angry politician.

There was always something imminent about him, like an avalanche that the sound of your voice might loosen. The word demanded by the occasion was instantly on his lips, whether it were to give pleasure or pain. In his presence one felt that the day of judgment might come at any moment. No easy tolerance with him, but you could always count on the just word, the square deal, and tolerance of your opinion if it were well founded.

The charge that he was an impulsive man has no foundation; it was a wrong interpretation of his power of quick decision. His singleness of purpose and the vitality and alertness of each of his many sides enabled him to decide quickly where others hesitate and stumble. The emphasis and the sharpness of his yea and nay, were those of a man who always knew his own mind and knew it instantly. What seemed rashness in him was only the action of a mind of extraordinary quickness and precision. His uncompromising character made him many enemies, but without it he would not have been the Roosevelt who stamped himself so deeply upon the hearts and the history of his countrymen.

When I think of his death amid these great days when such tremendous world events are fast becoming history, and recall what a part he could have played in them, and would gladly have played, had his health permitted, I realize with new poignancy what a loss the world has suffered in his passing! A pall seems to settle upon the very sky. The world is bleaker and colder for his absence from it. We shall not look upon his like again.

Farewell! great Soul, farewell!

The warm human fellowship about the camp fire, where our thoughts turned to great adventures, and our tongues uttered intimate words of home and friends and the great adventure which is life

Courtesy of Charles Scribner's Sons

Roosevelt in South America on the expedition which explored and mapped the "River of Doubt," now the Rio Téodoro.—Roosevelt's books covering his explorations and his observations on animal life were written in the field, which in large measure accounts for their accuracy and vividness. (He is here shown protected from fever-carrying insects by gloves and a mosquito net helmet)

Courtesy of Charles Scribner's Sons

The canoes of Roosevelt and Colonel Rondon on the "River of Doubt" at the junction of a large tributary, the Bandeira

Theodore Roosevelt, Naturalist

PERSONAL AFFILIATION WITH THE AMERICAN MUSEUM—SERIOUS AND SINCERE PURPOSE AS EXPLORER AND NATURALIST

By HENRY FAIRFIELD OSBORN

ROOSEVELT spent the first years of his life and the last years as a naturalist, and it chanced that he was in close touch with the American Museum at both ends of his wonderful career. In the range of his life as a naturalist, as an observer, traveler, explorer, writer, and last but not least, a biological philosopher, as in the range of his work over the vast fields of history, of government, and of international relations, his service was stupendous; and now that we are able to look at his life as a whole, we realize that he was not *one* man, but many great men, many personalities, combined and harmonized into one,—all impelled by indomitable will and determination, all inspired by idealism, all warmed and humanized by the most loving and sympathetic temperament.

This manifold ability and multiple nature came out in the course of his plans for a great expedition to South America, projected in the spring of 1913 and executed between October, 1913, and June, 1914. He had selected an unknown and particularly dangerous region, where the native tribes had never been thoroughly subdued by the Brazilian Government. He marked out this region as his first choice for a South American expedition, but I sent word to him through Dr. Frank M. Chapman, who was representing us in these plans, that I would never consent to his going to this particular region under the American Museum flag; that I would not even assume part of the responsibility for what might happen in case he did not return alive. With a smile he sent back a characteristic word: "I have already lived and enjoyed as much of life as any nine other men I know; I have had my full share, and if it is necessary for me to leave my remains in South America, I am quite ready to do so." Although more prudent plans prevailed, and we finally determined upon a route which resulted in the discovery of the Rio Roosevelt, yet the exposure, the excessively moist climate, and the dearth of food, clothing, and supplies, very nearly cost Theodore Roosevelt his life.

It was Roosevelt's warm sentiment for his native city and the survival of the memories of his boyhood education as an ornithologist, so delightfully described by himself in the pages of the JOURNAL,[1] which brought him back into relation with the American Museum, after he had, by means of his two years in Africa, completed his magnificent service to our National Museum at Washington immediately on leaving the presidency.

In planning the South American journey, as in planning that to Africa, he prepared with the utmost intelligence and thoroughness for what he knew would be a hazardous trip, even after all precautions had been taken. With the trained assistance of his son Kermit Roosevelt, with the South American experience and stalwart courage of Mr. George K. Cherrie, and with the devoted and most intelligent companionship of Colonel Candido Mariano da Silva Rondon and Mr. Leo E. Miller, this expedition developed into the most important that has ever gone from North into South America. As a result of this expedition through Para-

[1] "My Life as a Naturalist," AMERICAN MUSEUM JOURNAL, May, 1918.

guay and the wilderness of Brazil, more than 450 mammal and 1375 bird specimens were added to the American Museum's collections, in addition to the geographic results which aroused such a chorus of discussion and diversity of opinion. Roosevelt was so impressed with the importance of continuing this exploration, that on his return he personally contributed $2000 from his literary earnings, to send his companion naturalists back to the field. The Museum accordingly sent Messrs. Leo E. Miller and Howarth Boyle to Colombia and Bolivia, and Mr. Cherrie to the marshes of Paraguay, to continue the work of the first Roosevelt Expedition.

An American statesman, who should have known better, has recently characterized Roosevelt as "one who knew a little about more things than anyone else in this country." This gives an entirely false impression of Roosevelt's mind. His mind was quite of a contrary order; for what Roosevelt did know, he knew thoroughly; he went to the very bottom of things, if possible; and no one was more conscientious or modest than he where his knowledge was limited or merely that of the intelligent layman. His thorough research in preparing for the African and South American expeditions was not that of the amateur or of the sportsman, but of the trained naturalist who desires to learn as much as possible from previous students and explorers. During his preparation for the African expedition, I sent him from the rich stores of the American Museum and Osborn libraries all the books relating to the mammal life of Africa. These books went in installments, five or six a week; as each installment was returned, another lot was sent. Thus in the course of a few weeks he had read all that had been written about the great mammals of Africa from Sclater to Selous. He knew not only the genera and species, but the localities where particular species and subspecies were to be found. I remember at a conference with African great game hunters at Oyster Bay, where were assembled at luncheon all the Americans that he could muster who had actually explored in Africa, a question arose regarding the locality of a particular subspecies, Grévy's zebra (*Equus grevyi foai*). Roosevelt went to the map, pointed out directly the particular and only spot where this subspecies could be found, and said that he did not think the expedition could possibly get down in that direction. This was but one instance among hundreds not only of his marvelous memory but also of his thoroughness of preparation.

We shall have a memorial of Theodore Roosevelt, the Naturalist, in the American Museum of Natural History. He honored the institution by his presence; he loved it and gave his inspiring touch to many branches of its activity during the closing years of his life. In the intervals of politics, of pressing duties of every kind, he would repair here for keen and concentrated discussions on animal coloration, or geographic distribution, or the history of human races, or the evolution of some group of animals, or, perchance, the furtherance of some expedition. What the Roosevelt memorial shall be it is premature to say, except that it will certainly be a memorial to the beautiful and courageous aspect of his manifold character and life as a naturalist. This memorial will be such as to remind the boys and girls of all future generations of Americans of the spirit of love, of zeal, and of intelligence with which they should approach nature in any of its wonderful aspects.

Roosevelt—The Friend of Man

By ROBERT E. PEARY

Rear Admiral, United States Navy, Retired; President, Aërial League of America; Chairman, National Aërial Coast Patrol Commission

A SORROWING nation pays meet tribute to the passing of the greatest American of his time—Theodore Roosevelt.

The one outstanding feature of the complex character of Roosevelt, the man of many parts, was his friendship for man in the abstract—and when this friendship took concrete form for the individual, it became, for its recipient, a tower of strength as fortifying and as impregnable as Gibraltar.

The friendship of Theodore Roosevelt was indeed a most precious possession. Whenever and wherever extended, it had the effect of a superlative super-incentive to greater deeds—a step by step advancement, onward and upward, never permitting a retrogression.

I make the following statement without fear of successful contradiction, that no other single personality in this great world of ours today has gathered from such a multitude, from all quarters, kinds, and conditions of life, the utmost in spontaneous affection that has been accorded him during his years of contact with a world's people.

Thousands upon thousands, in all parts of the world, became his friend through the magnetic personality of his written words, which have reached to the uttermost extremes of enlightened civilization all over the globe.

Inestimable tribute should be paid to Colonel Roosevelt's memory for the advice and support, given when President of the United States, to the Peary Arctic Club Expedition to the North Polar Regions which resulted in reaching the Pole April 6, 1909.

In 1912, at the annual dinner of the Explorers' Club, I ventured the prophecy that in a few years the polar regions would be reconnoitered and explored through the air. That prophecy is about to be consummated.

The great war has forced the development of the science of aëronautics and aircraft to that point where no portion of the globe exists today that cannot be visited and explored by either plane or dirigible. It is indeed a fitting tribute to Colonel Roosevelt's earnest support of aëronautics, at all times, that the Bartlett Arctic Expedition, promulgated and organized through the efforts of the Aëro Club of America, should be known as "The Roosevelt Memorial Expedition."

Colonel Roosevelt was a veteran supporter of aëronautics. In 1897, when he was Assistant Secretary of the Navy, he used his influence to secure the necessary appropriation needed by Professor Langley to continue his plans for aviation. Colonel Roosevelt was also responsible for giving the United States Army an aëroplane before any other nation had one. In 1907 he approved the ordering of a biplane and a dirigible.

Scientific results of inestimable value to the United States and to the whole world are directly traceable to Roosevelt's friendship for man.

Theodore Roosevelt and Africa

THE MAN WHO FELT THE ATTRACTION OF LIFE IN THE SILENT PLACES AND THE WIDE WASTE SPACES OF THE EARTH

By CARL E. AKELEY

FROM field naturalists who knew Roosevelt he always received profound and unstinted admiration; they knew that his greatest pleasure lay in seeing and learning; that he found infinite joy in studying wild animal life in its native haunts; that he had the observing eye and keen mind of the ideal naturalist.

His expedition to Africa had been definitely planned in his mind several years before it actually came about. I had returned from an expedition to Africa late in 1907, and recall the emphasis of his words at the White House one day as he said to me, "When I am through with this job, I am going to Africa."

I met him in Africa in 1912 on the Uasin Gishu Plateau. It was morning and our American Museum Expedition was marching toward the N'Zoia River, when one of the boys called my attention to a *safari* two miles or so to the south. With the thought that it might possibly be the Roosevelt Expedition, I sent a runner to make inquiry, while we proceeded to the banks of the river and made camp. The runner soon returned, stating that he had met a runner halfway, that it was the Roosevelt party, and that they were going into camp on the edge of the marsh not far from where we had seen them.

When our camp was made, we started out on our horses in the direction of the marsh, but when about halfway met the Colonel with Kermit, and two others of his party. We all returned to our camp and a good part of the afternoon was spent making arrangements for an elephant hunt for the next day.

Within an hour or two after leaving camp in the morning, we picked up the trail of a small herd of elephants, and as they were easily tracked through the grass, we moved very rapidly. At about eleven o'clock, while we were following the trail quite casually, someone in advance heard a sound which resulted in our coming to a standstill. We made a short detour to the left, and a few minutes later were looking at a small band of cows and calves enjoying their midday siesta under a clump of bush. We advanced under cover of a large ant hill to within about fifty yards, from which point we looked them over carefully and decided which were valuable for our scientific purpose.

I indicated the particular cow that I wanted the Colonel to shoot for the American Museum group. Of course at this distance from the elephants we could speak only in lowest whispers and every move was guarded. I waited for the Colonel to take a shot, expecting him to do this from behind the ant hill where we were afforded a splendid protection against a charge, but he started forward toward the elephants and I, with Kermit, was obliged to follow closely. My impulse was to tell him that I wanted him to shoot the cow and not "take her alive!" He continued to go steadily forward, however, intending to get so close that there could be no doubt of the effectiveness of his shot; but the elephants suddenly began moving in our direction, at which he promptly fired. This did not stop their advance, but rather accelerated it instead, so that quick action was necessary. When we got through we had four dead elephants.

All of the party, except the Colonel

and myself, returned to camp to send out tools, equipment, and men, preparatory to taking care of the great skins and skeletons of the four elephants. He and I sat down under a tree with our luncheon, and for two or three hours we conversed of intimate things. For a number of months the Colonel had seen no one from home except the members of his own party. We were fresh from the United States and there was much to talk of. He spoke much of his family, of Mrs. Roosevelt, and his sons and daughters. It was then that I learned to love Roosevelt.

It is not an easy thing to give expression to the thoughts that come to my mind of this man who has so recently passed beyond our range of vision. What I feel most is that whereas Roosevelt is gone, his influence seems greater than ever. Many of us will feel, with respect to the things that Roosevelt wanted us to do and which we never seemed to have time to do, that now we have time for nothing else.

As to Africa, perhaps no man in modern times has gotten so much out of the "Dark Continent" as did Roosevelt. In the "Foreword" of his *African Game Trails* he describes Africa in two pages with a vividness others have failed to give in volumes. And no single sentence of it consists of word and phrase merely: every bit of it stands for the man's own personal experience and his own intense thinking and feeling. I wish that the African hall of the American Museum might be done as a memorial to Theodore Roosevelt. I would have this Foreword on a bronze tablet at the entrance:

Africa[1]*—In the Words of Roosevelt*

"I speak of Africa and golden joys"; the joy of wandering through lonely lands; the joy of hunting the mighty and terrible lords of the wilderness, the cunning, the wary, and the grim.

In these greatest of the world's great hunting-grounds there are mountain peaks whose snows are dazzling under the equatorial sun; swamps where the slime oozes and bubbles and festers in the steaming heat; lakes like seas; skies that burn above deserts where the iron desolation is shrouded from view by the wavering mockery of the mirage; vast grassy plains where palms and thorn-trees fringe the dwindling streams; mighty rivers rushing out of the heart of the continent through the sadness of endless marshes; forests of gorgeous beauty, where death broods in the dark and silent depths.

There are regions as healthful as the northland, and other regions, radiant with bright-hued flowers, birds and butterflies, odorous with sweet and heavy scents, but treacherous in their beauty, and sinister to human life. On the land and in the water there are dread brutes that feed on the flesh of man; and among the lower things that crawl, and fly, and sting, and bite, he finds swarming foes far more evil and deadly than any beast or reptile; foes that kill his crops and his cattle, foes before which he himself perishes in his hundreds of thousands.

The dark-skinned races that live in the land vary widely. Some are warlike, cattle-owning nomads; some till the soil and live in thatched huts shaped like beehives; some are fisherfolk; some are ape-like naked savages, who dwell in the woods and prey on creatures not much wilder or lower than themselves.

The land teems with beasts of the chase, infinite in number and incredible in variety. It holds the fiercest beasts of ravin, and the fleetest and most timid of those beings that live in undying fear of talon and fang. It holds the largest and the smallest of hoofed animals. It holds the mightiest creatures that tread the earth or swim in its rivers; it also

[1] Quoted from the Foreword of *African Game Trails*, through the courtesy of Charles Scribner's Sons.

holds distant kinsfolk of these same creatures, no bigger than woodchucks, which dwell in crannies of the rocks, and in the tree tops. There are antelope smaller than hares, and antelope larger than oxen. There are creatures which are the embodiments of grace; and others whose huge ungainliness is like that of a shape in a nightmare. The plains are alive with droves of strange and beautiful animals whose like is not known elsewhere; and with others even stranger that show both in form and temper something of the fantastic and the grotesque. It is a never-ending pleasure to gaze at the great herds of buck as they move to and fro in their myriads; as they stand for their noontide rest in the quivering heat haze; as the long files come down to drink at the watering-places; as they feed and fight and rest and make love.

The hunter who wanders through these lands sees sights which ever afterward remain fixed in his mind. He sees the monstrous river-horse snorting and plunging beside the boat; the giraffe looking over the tree tops at the nearing horseman; the ostrich fleeing at a speed that none may rival; the snarling leopard and coiled python, with their lethal beauty; the zebras, barking in the moonlight, as the laden caravan passes on its night march through a thirsty land. In after years there shall come to him memories of the lion's charge; of the gray bulk of the elephant, close at hand in the sombre woodland; of the buffalo, his sullen eyes lowering from under his helmet of horn; of the rhinoceros, truculent and stupid, standing in the bright sunlight on the empty plain.

These things can be told. But there are no words that can tell the hidden spirit of the wilderness, that can reveal its mystery, its melancholy, and its charm. There is delight in the hardy life of the open, in long rides rifle in hand, in the thrill of the fight with dangerous game. Apart from this, yet mingled with it, is the strong attraction of the silent places, of the large tropic moons, and the splendor of the new stars; where the wanderer sees the awful glory of sunrise and sunset in the wide waste spaces of the earth, unworn of man, and changed only by the slow change of the ages through time everlasting.

Personal Glimpses of Theodore Roosevelt

By DAVID STARR JORDAN

ROOSEVELT entered Harvard College in 1876 at the age of eighteen, hoping to become a naturalist, having already made a considerable collection of birds, besides many observations as to their habits. His eyesight being defective, however, and not connecting well with magnifying glasses, his early ambition was discouraged by his teachers to whom the chief range of study lay within the field of the microscope. They overlooked the fact that besides primordial slime and determinant chromosomes, there were also in the world grizzly bears, tigers, elephants and trout, as well as song birds and rattlesnakes,—all of which yield profound interest and are alike worthy of study.

So, being discouraged as to work along his chosen line, and in his love of outdoor science, the young naturalist turned to political philosophy, his secondary interests lying in history and politics. He then closed up his private cabinet, giving his stuffed bird skins (through Professor Baird of the Smithsonian) to me. These I transferred to the University of Indiana where they are now in a befitting glass case in Owen Hall, each skin nicely prepared and correctly labeled in the crude boyish handwriting which the distinguished collector never outgrew.

Long after all this, I once took occasion to remind Mr. Roosevelt that "they spoiled a good naturalist" in making him a statesman. But the naturalist was never submerged in the exigencies of statesmanship. During an automobile drive in 1912 across the Santa Clara Valley, Roosevelt displayed a keen interest in the sparrows and warblers of the thickets along the road. These he could call by their first names and mostly by their second. Once in the Yosemite with John Muir, he noted elements in bird and squirrel life which had escaped even his keen-eyed and sympathetic companion.

In our exploration of Hawaii in 1901, my colleague, Dr. Barton W. Evermann, and I came across a very beautiful fish, the *Kalikali,* golden yellow with broad crossbands of deep crimson. This then bore the name of *Serranus brighami* given it by its discoverer, Alvin Seale. But the species was no *Serranus;* and it was moreover plainly the type of a new genus. This we called *Rooseveltia,* in honor of "Theodore Roosevelt, Naturalist" and in recognition of his services in the promotion of zoölogical research. With this compliment he was "delighted." "Who would not be?" he said.

In the various natural history explorations undertaken by me—and by others during his administration as President of the United States—we could always count on intelligent and effective sympathy. In so far as scientific appointments rested with him he gave them careful and conscientious consideration. Indeed, during his administration, governmental science reached its high-water mark. In 1905 I was preparing for an exploration of the deep seas around Japan by means of the Fish Commission steamer "Albatross." While I was talking this matter over with Roosevelt he said, pounding the table with his fist: "It was to help along things like this, Dr. Jordan, that I took this job!"

The story of Roosevelt's relation to Tutuila in Samoa has never been told, and though scientific only in part, it may be related here.[1]

The three islands of Samoa were held for a period of years under the joint protectorate of Great Britain, Germany, and the United States. The general result was unsatisfactory, a condition due mainly to the petty intrigues of German agents. In Stevenson's words, "There was a fresh conspiracy every day," and a good account of this situa-

[1] This incident is republished by courtesy of *The New Republic.*—THE EDITOR.

tion was given by "R. L. S." in *A Footnote to History*.

England at last exchanged her rights here for certain advantages elsewhere, and the islands themselves were divided, Upolu, the center of population, and Savaii, the largest of the group, going to Germany, while Tutuila, with its magnificent harbor at Pago Pago, and little Manua went to the United States. The native Tutuilans took the matter seriously and were much pleased with the new arrangement. The two chieftains, Mauga and Paa Vei, then caused to be drawn up an elaborate document formally deeding the sovereignty of their island to the United States. Now, in the etiquette of the South Seas, to receive a present without acknowledgment is a flagrant insult, but the people saw the United States occupy the island and erect docks, storehouses, and residences without a word of thanks.

When I went to Samoa in 1902, I found the inhabitants of Tutuila much worked up over the matter. Tuamanua, chief of the tiny outlying island, was in a state which, on a larger scale, would be called rebellion. I went before the little congress at Pago Pago and explained to the people that the United States did not wish to take away any of their rights. It had paid the owners for the land occupied as well as for all service required. It had, moreover, through the governor, Captain (later Rear Admiral) Uriel Sebree, taken great pains to safeguard the interests of the people in their relations to traders in copra, the dried meat of the cocoanut which is the principal export of that region. I also called attention to the fact that in the interest of the people the President had sent Professor Vernon Kellogg (of Stanford University) and me to study the fisheries of the islands to find out all the kinds and what they were good for. I had myself furnished them with a series of paintings of poisonous fishes, some species having in their tissues a substance analogous to strychnine, which would produce the dangerous and often fatal disease known as *ciguatera*. In addition, Professor Kellogg had rendered a material service in teaching them how to get rid of the mosquito and thus to abate their two most dreaded scourges, "dengue" and "elephantiasis," both diseases being produced by minute animal organisms carried from person to person by the mosquito.

I also called to their minds the sad fact that just about the time their deed of gift was received at Washington, the President of the United States had been assassinated by an insane ruffian. It was probable that in the confusion which followed, the document had been misplaced and the incoming President, always thoughtful about such matters, had possibly never seen it. I would bring the affair to his attention, sure that he would make a courteous response. This kept the people quiet for the time, and expectant as to the future.

I then sent a statement of facts to the President, and soon after left the island; but I read in the press in the fall of 1902 that President Roosevelt had sent a gold watch each to Mauga and Paa Vei, also a flag to the little native police corps or *Fitafitas*, and that in Pago Pago they had had a "red-letter day of rejoicing."

On returning to Washington I found that the deed of gift had been filed under the head of "Docks," Pago Pago, from the official point of view, being merely the water front of a naval station. Fear of precedent had prevented acknowledgment.

McKinley's advisers emphasized this point but Roosevelt characteristically did not care a straw for precedent. He did what a natural man should do. *He made it right with the people.* He said afterward to me in regard to it, "It always pays for a nation to be a gentleman."

Roosevelt, the Man of Abundant Life[1]

By GIFFORD PINCHOT

WE who loved Roosevelt have not lost him. The qualities we treasured in him, his loyalty, his genial kindness, his unwearied thoughtfulness for others, the generosity which made him prefer his friends in honor to himself, his tenderness with children, his quick delight in living, and the firm soundness of his life's foundations, are potent with us yet. The broad human sympathy which bound to him the millions who never saw his face, his clean courage and self-forgetful devotion to his country, the tremendous sanity of his grasp on the problems of the nation and the world, and the superb simplicity and directness of his life and thought still live as the inspiration and the basis for the new and better world which is to come.

The people loved Roosevelt because he was like them. In him the common qualities were lifted to a higher tension and a greater power, but they were still the same. What he did plain men understood and would have liked to do. The people loved him because his thoughts, though loftier, were yet within their reach, and his motives were always clear in their sight. They knew his purposes were always right. To millions he was the image of their better selves.

Roosevelt was the greatest preacher of righteousness in modern times. Deeply religious beneath the surface, he made right living seem the natural thing, and there was no man beyond the reach of his preaching and example. In the sight of all men, he lived the things he taught, and millions followed him because he was the clear exemplar of his teaching.

Unless we may except his Conservation Policies[2] Roosevelt's greatest service during his presidency was the inspiration he gave young men. To them he was the leader in all they hoped to be and do for the common good. The generation which was entering manhood while he was President will carry with it to the grave the impress of his leadership and personality.

To the boys of America he was all they hoped to be—a hunter, a rider, a sportsman, eager for the tang of danger, keen and confident, and utterly unafraid. There was no part of his example but was good for boys to follow. Roosevelt, half boy till his life's end, yet the manliest of men, of a fineness his best friends best understood, was their ideal, and will not cease to be because he has passed on.

To him the unforgivable sin, and there was but one, was betrayal of the interests of his country. The man who

[1] Address at Roosevelt Memorial Meeting, Metropolitan Opera House, Philadelphia, afternoon of Sunday, February 9.

[2] The name of Gifford Pinchot is closely connected with the work in conservation accomplished by Roosevelt, who states the high value he placed on Mr. Pinchot's services in the chapter on "The Natural Resources of the Nation" in his *Autobiography* (p. 429):

"Gifford Pinchot is the man to whom the nation owes most for what has been accomplished as regards the preservation of the natural resources of our country. He led, and indeed, during its most vital period embodied, the fight for the preservation through use of our forests. He played one of the leading parts in the effort to make the national Government the chief instrument in developing the irrigation of the arid West. . . ."

The story of the forestry work of the Roosevelt administration is one of great historical interest. It includes the training of foresters at a newly opened forest school at Yale, the development of our present Forest Service with trained foresters in control of the public lands, the great increase by Executive Order of the area of the national forests, and their opening to settlers under regulation, the calling of the first meeting of governors in this country (May, 1908), and the appointment of a National Conservation Commission with the purpose of making an inventory of all the resources of the nation. Gifford Pinchot was chairman of this commission. All of this work from 1901 to 1909 formed the basis of the country's present practical enlightenment on conservation.—THE EDITOR.

sinned that sin he neither forgave nor forgot. For opposition to himself he cared but little; enemies he had in plenty, but they cast no shadow on his soul. He was a gallant and a cheerful fighter, willing, as he often said, to be beaten for any cause that was worth fighting for, and whether in defeat or victory, never unbalanced and never dismayed.

Roosevelt lived intensely in his family life. The doer of great things himself, and the occasion of great accomplishment in others, what he did was not done alone. It is but right that we should recognize the part played by the strong and gentle, wise and loving woman, whose hand was so rarely seen yet still more rarely absent in all that was best in her great husband's finest living and most memorable achievements.

The greatest of executives, he transformed the machinery of government with the flame of his own spirit. He was his own hardest taskmaster, and always unwilling to ask of his men the thing he was not ready to do himself. He was our leader because he was the better man. He worked more hours, at higher speed, with wider vision. He trusted us, and gave each man his head. Always eager to recognize good work and give due credit for it, always ready with an excuse for the man who honestly tried and failed, he had nothing but scorn and contempt for the man who never tried at all.

Filled with the joy and the spice of living, afraid neither of life nor of death, thankful for sunshine or rain, never sorry for himself, never asking odds of any man or any situation, he used the powers he had as only his great soul could use them—powers seldom if ever before assembled in one individual, but nearly all of them duplicated, one here, one there, within the knowledge of us all. It was the use his soul made of his body and his mind that was the essence of his greatness.

The greatest of his victories was his last, his victory over the indifference of a people long misled. He was the first to see the need for it. To gain it he seemed to throw away his future. In the event he won results and earned a name which will live while the knowledge of America's part in the Great War still endures.

He was the leader of the people because his courage and his soundness made him so. More than any man of his time, he was loved by those who ought to love him, and hated by those who ought to hate him. His ideals, his purposes, his points of view, his hostilities, and his enthusiasms were such as every man could entertain and understand. It was only in the application of them that he rose to heights beyond the reach of all the rest of us.

What explains his power? Life is the answer. Life at its warmest and fullest and freest, at its utmost in vigor, at its sanest in purpose and restraint, at its cleanest and clearest,—life tremendous in volume, unbounded in scope, yet controlled and guided with a disciplined power which made him, as few men have ever been, the captain of his soul. Alert, glad, without meanness and without fear, free from arrogance and affectation, with few hesitations and few regrets, slow to promise but ardent to perform, delighting in difficulties, welcoming danger, sensitive to the touch of every phase of human existence, yet dominated by standards more severely set for himself than for any others, sustained by a breadth of knowledge and of sympathy and by an endurance, both physical and mental, which belonged to him alone, Roosevelt lived with a completeness that lesser men can never know.

In Roosevelt above all the men of his time, the promise of the Master was fulfilled—"I came that ye might have life, and that ye might have it more abundantly."

Photograph by Kermit Roosevelt

Roosevelt and Carl E. Akeley elephant hunting on the Uasin Gishu Plateau, British East Africa

The elephant shown here, lying where it fell from Roosevelt's shot, is one in the group now in preparation in the American Museum's elephant studio. Roosevelt, while on his African Expedition, hunted and shot elephants for permanent exhibition in the United States National Museum and the University of California

SERIES OF PHOTOGRAPHS

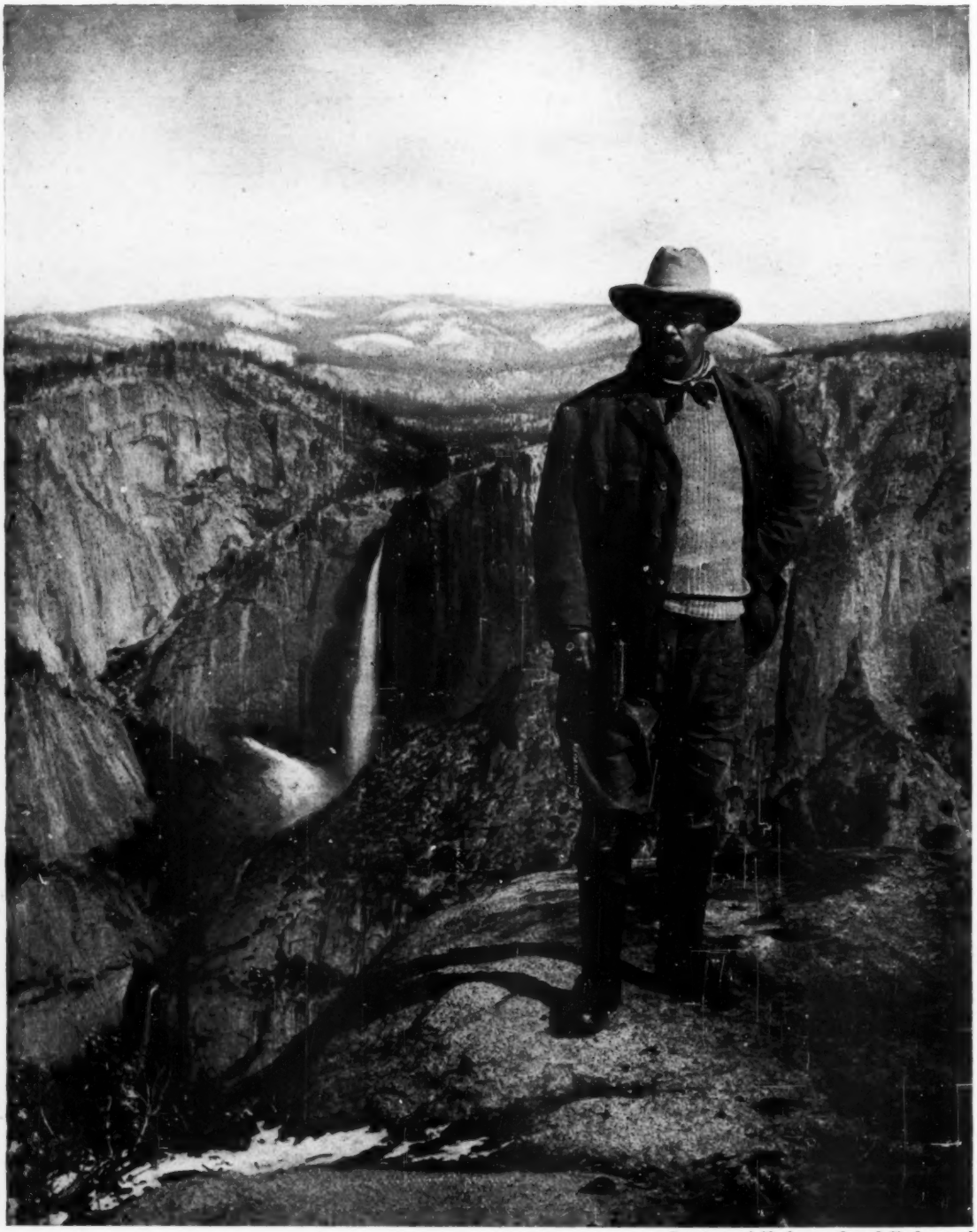
SUGGESTIVE OF

THE VARIED ACHIEVEMENTS AND INTERESTS OF

THEODORE ROOSEVELT

EXPLORER, NATURALIST, SOLDIER, STATESMAN,

WRITER, AND FRIEND OF MAN



Courtesy of Underwood and Underwood

ROOSEVELT AND YOSEMITE

The man who had a broad vision of things spiritual.—In an address on nations and their future ("Biological Analogies," delivered at Oxford University, 1910), he points out that there are many ominous signs to warn the nations that their growth approaches the fate of the law of death of nations. He makes clear that the all-important factor is national character, that there promises a great future for the civilizations which have expanded in the course of their development, but that if it does not come, we must at least all carry forward the torch which men mighty of heart have handed on from civilization to civilization throughout recorded time

Courtesy of Underwood and Underwood

ON A HUNTING TRIP IN COLORADO, 1905

"It is an incalculable added pleasure to anyone's sense of happiness if he or she grows to know, even slightly or imperfectly, how to read and enjoy the wonder-book of nature. All hunters should be nature-lovers. It is to be hoped that . . . from now on the hunter will stand foremost in working for the preservation and perpetuation of the wild life, whether big or little."—From *Pastimes of an American Hunter.*

The invitation to get out into the western country on hunting trips for a few weeks each year came to Roosevelt neither from the delights of natural history and sportsmanship alone, nor alone from interest in conservation problems; he especially gloried in remembering the heroic part played by the pioneers, and by the nation in handling early problems of statehood:

". . . In all the history of mankind there is nothing that quite parallels the way in which our people have filled a vacant continent with self-governing commonwealths, knit into one nation. . . . It is a record of men who greatly dared and greatly did; a record of endless feats of arms, of victory after victory and ceaseless strife waged against wild man and wild nature. . . . The old iron days have gone. . . . Let us see to it that, while we take advantage of every gentler and more humanizing tendency of the age, we yet preserve the iron quality. . . . We need the positive virtues of resolution, of courage, of indomitable will, of power to do without shrinking the rough work that must always be done, and to persevere. . . ."—From address at the Quarter-Centennial Celebration of Statehood in Colorado

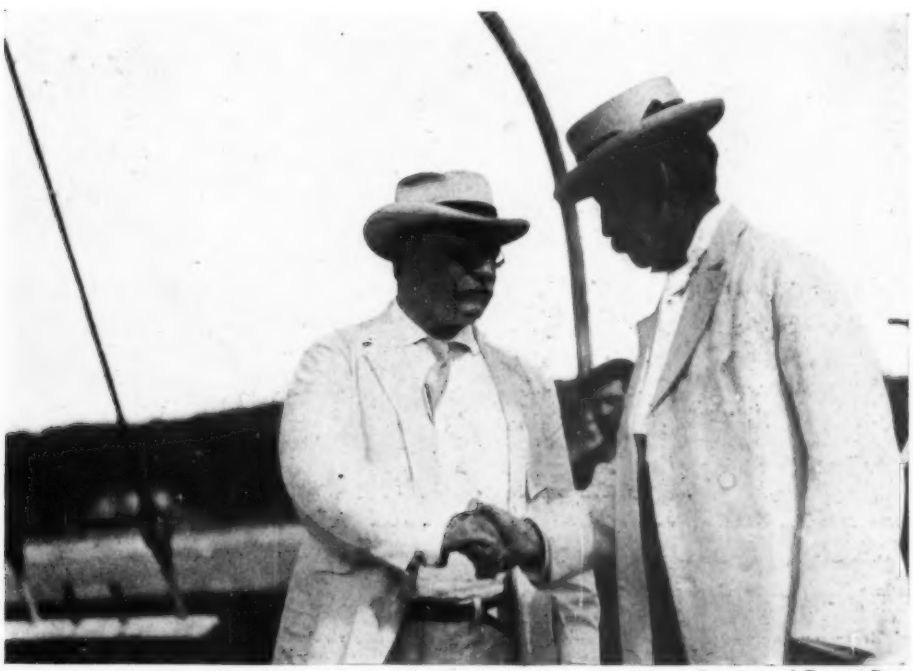
With John Burroughs in Yellowstone Park, 1903.—They are on their way to the big geyser region, Roosevelt, in accordance with his habit from a boy on such occasions, sitting with the driver of the sleigh. Roosevelt was especially interested in the big game and would go entirely alone on long twenty-mile tramps for the pleasure of creeping up unawares on a band of elk or mountain sheep and eating his luncheon while he studied them. Burroughs says, in telling their experiences and laughter when racing on skis down some of the hills: "The spirit of the boy was in the air about the Cañon of the Yellowstone, and the biggest boy of us all was President Roosevelt." It was on this trip that Mr. Burroughs first came to know of Roosevelt's great natural history knowledge and of his trained powers of observation:

"Born observers are about as rare as born poets. Plenty of men can see straight and report straight what they see; but the men who see what others miss, who see quickly and surely, who have the detective eye, like Sherlock Holmes, who 'get the drop,' so to speak, on every object, who see minutely and who see whole, are rare indeed. President Rooseve't comes as near fulfilling this ideal as any man I have known."—From *Camping and Tramping with Roosevelt*, by John Burroughs

Portraits of two bird lovers in the Yellowstone.—He lived thus in the wilderness, he followed the elk and the antelope, he listened to bird songs as though there were nothing else in the world. But he emerged after a few days into a world of people, politics, and speeches again, and waged anew and strenuously the fight for a high type of national service

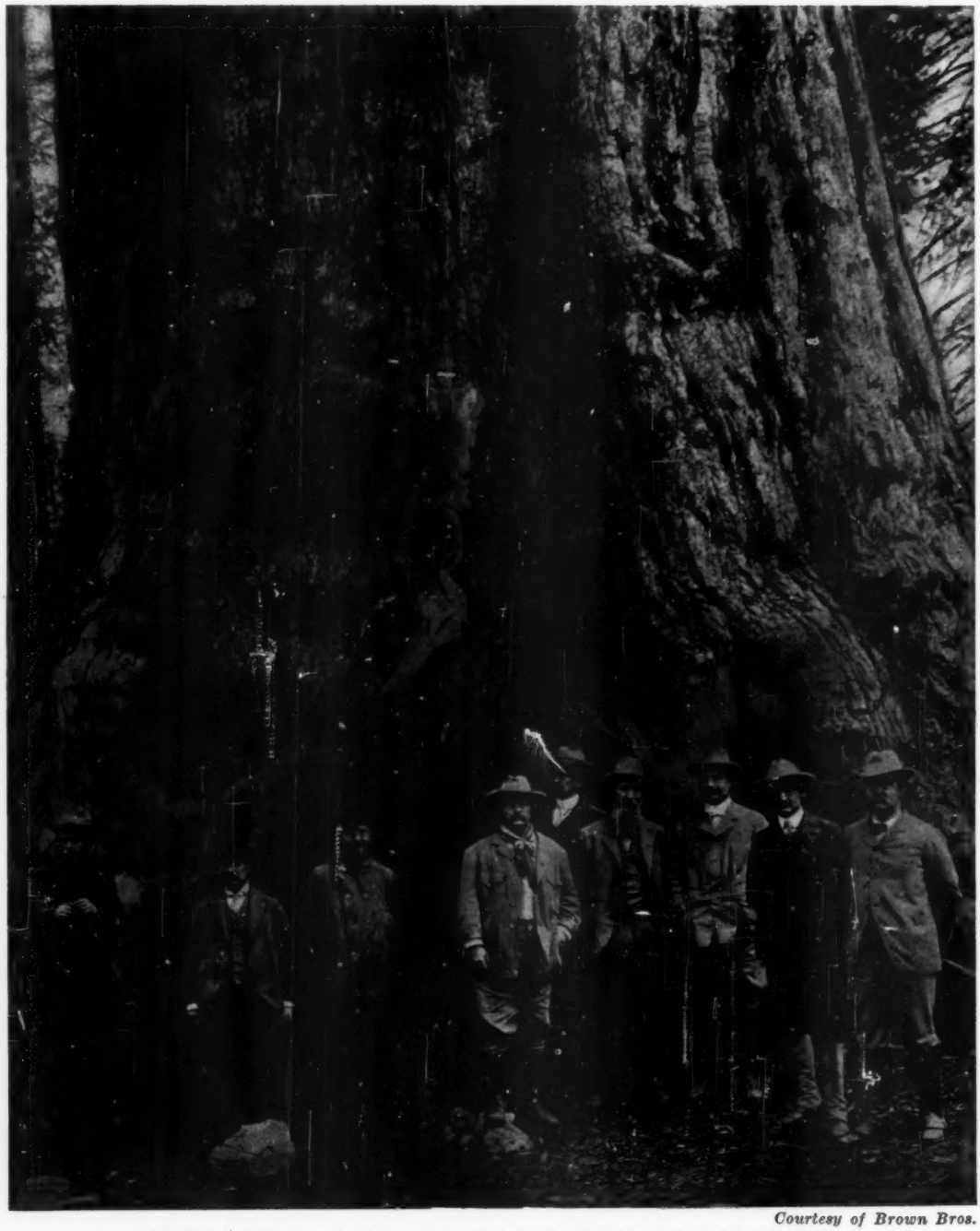
Courtesy of Brown Bros.

Roosevelt with a group of East Side children.—Roosevelt believed in the doctrine of will for a man, and he had a conscience, and he helped New York grow a legislative conscience, beginning even before the day when he knew Jacob Riis and *How the Other Half Lives.* The following is one of the truest things Mr. Riis says of him in *Roosevelt, the Citizen:* "The fact is he is a perfectly logical product of a certain course of conduct deliberately entered upon and faithfully adhered to all through life, as all of us are who have any character worth mentioning." New York's East Side gave genuine reverence to this character of Roosevelt which fearlessly righted wrongs in tenements and playgrounds, in liquor and police laws. He believed in the good in his fellow men, and his trust was never more fully justified than in his work on New York's East Side



Courtesy of Brown Bros.

An inspiration back of Peary's work.—It is easy to understand that with his admiration for courage and hardihood no man in America was more ready than Roosevelt to do homage to the great explorer. Also with his love of wandering alone in the wilderness, and in his experience in standing in positions of great personal responsibility, none would so well appreciate the wearing loneliness and responsibility of the life of the explorer. He compares the explorer and the soldier as to these qualities in his Introduction to Peary's *Nearest the Pole*



Courtesy of Brown Bros.

BESIDE ' GRIZZLY GIANT," ONE OF THE SEQUOIAS HE PROTECTED

Theodore Roosevelt in California at the time of his administration (at the left stands Governor Pardee, at the right in order, John Muir; Dr. Butler, of Columbia; Secretary Loeb; and President Wheeler, of Berkeley).— We can realize the delight that it was for John Muir to show his beloved Yosemite and Sequoia cañons and forests to a man of Roosevelt's appreciation and power of observation. They spent three days at this time tramping and camping together, sleeping in the open, between trunks of giant Sequoias—as Roosevelt said later "in a great solemn cathedral, far vaster and more beautiful than any built by the hand of man."

Roosevelt's initial work in conservation of natural resources, especially of forests, will go down in history as the greatest constructive legislation ever established by an executive in the United States.

On the sixteenth of January, 1919, ten days after the death of Theodore Roosevelt, a bill designating the California giant redwood district as "Roosevelt National Park," passed the Senate of the United States unanimously. He said, in 1903, the Sequoias should be preserved because they are "the only things of their kind in the world," "monuments of themselves"—they now stand majestic monuments for him

Courtesy of Underwood and Underwood

AT WASHINGTON IN 1905

"I do solemnly swear that I will faithfully execute the office of President of the United States, and will to the best of my ability preserve, protect, and defend the Constitution of the United States. And thus I swear."

When Roosevelt became President in 1901 he was the youngest man who had ever taken the oath. His interest in natural history immediately recalled the administration of Thomas Jefferson; but he so far outstripped his predecessor that his seven and one half years in Washington marked a golden age for zoölogy, for exploration, and conservation, a time when scientific expeditions and publications were instigated and encouraged, and naturalists and explorers from all over the world were welcome guests at the White House.

As to statesmanship, a man of great constructive imagination was at the helm. He studied the problems of the nation and the psychology of men. He made himself accessible to every man from every section of the country. He learned their points of view, their interests. He worked with an insatiable desire to understand the thought and feeling of all ranks. Then, like the great synthetic scientist, the true leader, he marshalled all his data before him, formulated conclusions, and led the people where it was best for the good of the country and themselves that they should go.

But the greatest thing that Roosevelt did as President was to bring back to the mind of each man in the country a realization that the government is in truth "for the people, of the people, and by the people"

Courtesy of Underwood and Underwood

ROOSEVELT, THE THINKER AND WRITER.—HE PREACHES READABLENESS IN SCIENTIFIC WRITINGS

Theodore Roosevelt wrote plain prose, but which had the first characteristic of the highest type of writing, clearness. There was never anything uncertain or obscure about the meaning of what he wrote, any more than there was in his own mind about what he thought. And the meaning is always there, ideas jump out at us from the heat of his human experience to inflame our imagination and incite our action. Whether he wrote of the commonplace or the dramatic, it was with equal power —and sometimes also with great literary charm.

He has expressed definitely his own opinion on the form writing should take: "If he [the writer] . . . possesses the highest imagination and literary quality, he will be able to interest us in the gray tints of the general landscape no less than in the flame hues of the jutting peaks . . . Otherwise no profit will come from study of the ordinary; for writings are useless unless they are read, and they cannot be read unless they are readable." From this as a theme he eulogizes "the lofty imagination" necessary for the great historical or scientific writer, and drives away the bugaboos of "inaccuracy" and "shallowness" with which the technical writer often stigmatizes the "readable" book: "Very few great scientists have written interestingly, and these few have usually felt apologetic about it. Yet sooner or later the time will come when the mighty sweep of modern scientific discovery will be placed, by scientific men with the gift of expression, at the service of intelligent and cultivated laymen . . . Indeed, I believe that already science has owed more than it suspects to the unconscious literary power of some of its representatives [for instance, in regard to evolution] . . . where their predecessors had created hardly a ripple, Darwin and Huxley succeeded in effecting a complete revolution in the thought of the age . . . I believe that the chief explanation of the difference was the very simple one that what Darwin and Huxley wrote was interesting to read . . ."

Photographs by Herbert K. Job

SIMPLE DELIGHTS OF NATURAL HISTORY IN THE FIELD

In the picture above—Roosevelt and a young heron encounter each other face to face in a Louisiana Bird Preserve. Mr. Herbert K. Job also was a member of the party and snapped the photograph.

At the request of the National Association of Audubon Societies Roosevelt created the Louisiana Bird Preserves by Executive Order in 1904 and 1905. It was in 1915 that he made this tour of the islands with Mr. Job. Between March 14, 1903, and March 4, 1909, of his administration, he established by Executive Order fifty-one National Bird Reservations, distributed in seventeen states and territories from Porto Rico to Hawaii and Alaska.

The photograph below—One does not need to be a boy in years to enjoy a tour of discovery over the beaches of our Gulf Coast where great sea turtles have roamed when all was still and deposited their eggs under the sand

Photograph by Kermit Roosevelt

AFTER A LION SPEARING BY NANDI WARRIORS, AFRICA

This warlike tribe now lives in peace, under British rule, and the young warriors have little opportunity to win glory except in spearing the lions which sometimes kill their cattle. Roosevelt describes the spearing and the victory dance, in one of the most tense bits of description in *African Game Trails* (pp. 405–410).

Roosevelt accorded proportionately to the Negro tribes of Africa and the native helpers on his expedition the interest and appreciation he gave everyone. At home in America he was always the most democratic of men, yet moved in an aristocracy of his own choosing, an aristocracy of worth. Nationality did not matter, class, education, position, money, never counted. For him all depended on the individual strength of character of the man.

In the chapter on "Wild Hunting Companions" of a *Book Lover's Holidays*, he has written delightfully of the wild black boys of Africa who were his and Kermit's daily companions for many months under the equator. He expresses the strong attachment he felt for them, and his interest in them as representatives of an age far remote from that of white men of twentieth century civilization

Courtesy of Brown Bros.

SPEAKING TO THE STUDENT BODY AT HARVARD UNIVERSITY

Roosevelt has once and for all proved false the belief that an honest man and a gentleman cannot be in politics. He has inspired the young college man of high ideals to find success in public life.

"I suppose for one thing ordinary, plain, every-day duty sent me there [into politics] to begin with. . . . When I said I wanted to go to the Republican Association they told me that I would meet the groom and the saloon-keeper there; that politics were low, and that no gentleman bothered with them. 'Then,' said I, 'if that is so, the groom and the saloon-keeper are the governing class and you confess weakness. You have all the chances, the education, the position, and you let them rule you. They must be better men;' and I went."

"A heavy moral obligation rests upon the men of means and upon the men of education to do their full duty by their country. On no class does this obligation rest more heavily than upon the men with a collegiate education, the men who are graduates of our universities. Their education gives them no right to feel the least superiority over any of their fellow citizens; but it certainly ought to make them feel that they should stand foremost in the honorable effort to serve the whole public by doing their duty as Americans in the body politic."—From "Colleges and Public Life"

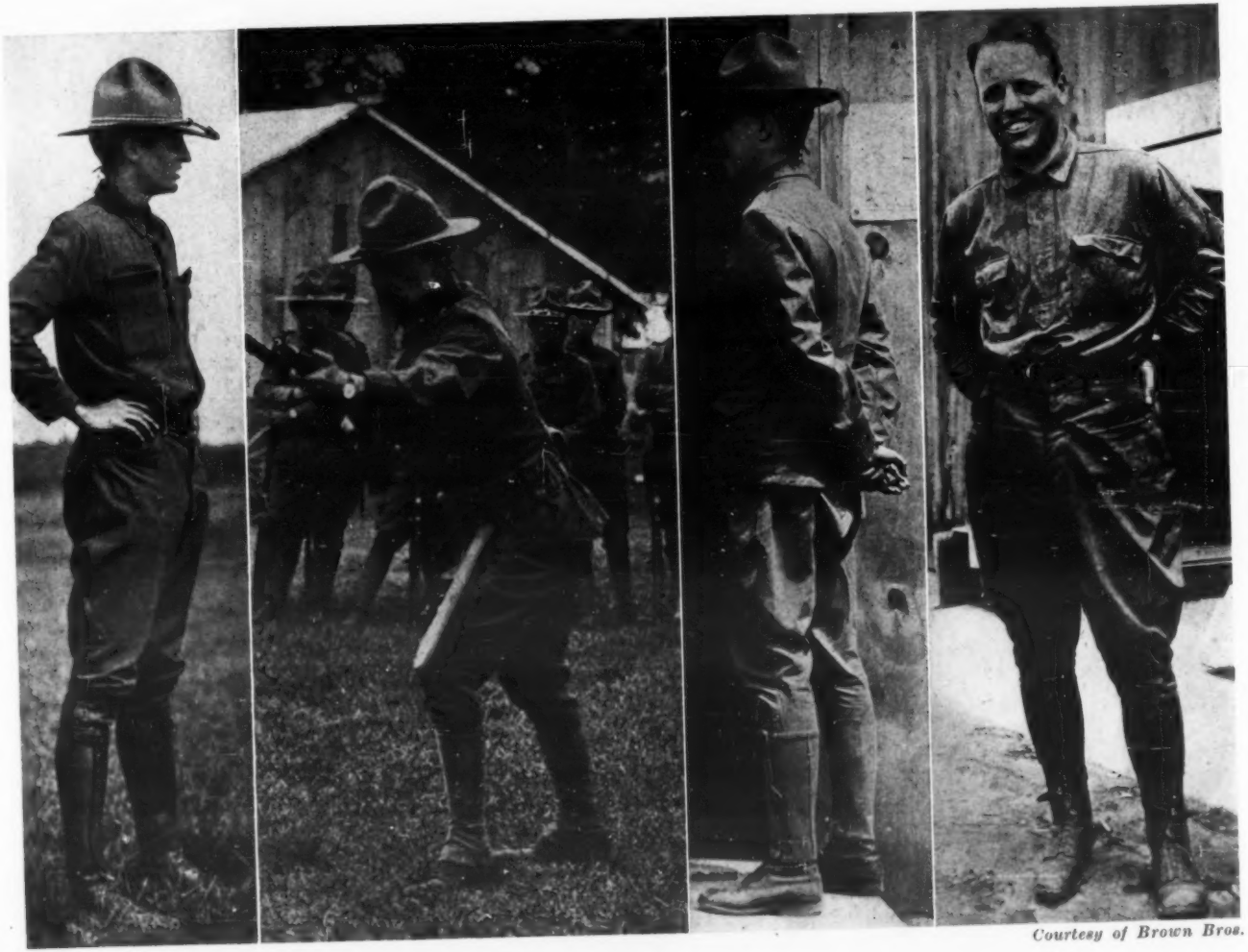
Courtesy of Underwood and Underwood

IN LONDON

A "Teddy Bear" joins the procession for an honorary degree at Cambridge University

Roosevelt saw ahead the natural spiritual bond the English language is likely to prove in the immediate future. During the years of the great war especially, he emphasized the need that all foreign-born men in America, now and hereafter, learn to speak English in order to possess the heritage of American ideals. Meanwhile, the war has been uniting English speaking peoples and shaping conditions to make the English language the language of the world. Roosevelt designated himself "like the Americans of tomorrow, rather than like the Americans of today; for I have in my veins the blood of men who came from many different European races." He foresaw that these "Americans of tomorrow" will have no feeling of the alien with any or all English speaking peoples of that future day, because a common language unites in things of the spirit, and "Common heirship in things of the spirit makes a closer bond than common heirship in the things of the body"

Courtesy of Underwood and Underwood



Courtesy of Brown Bros.

SONS OF THEODORE ROOSEVELT

(From left to right in the photograph)

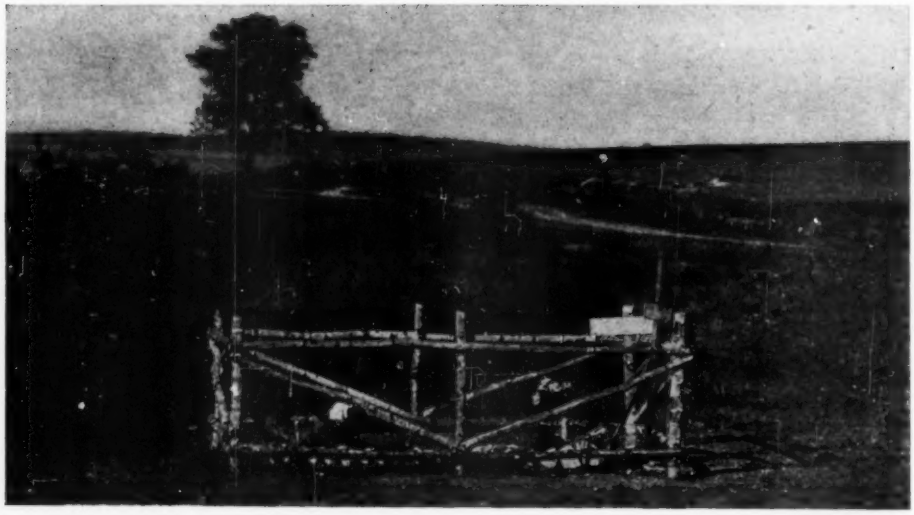
Archibald Roosevelt won a commission as volunteer in the first officers' training camp and was promoted to a captaincy in the 26th Infantry by General Pershing after reaching France. He was wounded in March, and is now in General Hospital No. 1, New York City. He was decorated with the French War Cross for gallantry in action.

Theodore Roosevelt, Jr., Lieutenant Colonel 26th Infantry, 1st Division, Army of Occupation, Germany. He commanded one of the first American battalions to go under fire. He was gassed in June and wounded in July. He won the French War Cross with three palms.

Kermit Roosevelt, Captain, 7th Field Artillery, 1st Division, Army of Occupation, Germany. He was formerly with the British Expeditionary Force in Mesopotamia, Light Armored Motor Battery. British D. S. C.

Quentin Roosevelt, Lieutenant 95th Aero Squadron, killed in action July 14, in preparation of the Soissons counter offensive. He had won the French War Cross.

Quentin Roosevelt, the youngest son, was but nineteen, a sophomore at Harvard. He volunteered at the first moment, as did the older sons, but was rejected because of defective vision. He was so eager to go, however, that he applied for entrance in the Canadian Flying Corps, but was finally taken instead into the United States Aviation Section (in April). He reached France just a few weeks after the other sons



Courtesy of Underwood and Underwood

QUENTIN ROOSEVELT SLEEPS ON FRENCH SOIL

Quentin Roosevelt was shot down while fighting at odds with enemy aëroplanes over the German lines in the Château-Thierry region. He was buried with military honors by German airmen near the spot where his machine fell. Much was expected of him, but he gave more. His sacrifice is to America as a symbol of the soul of democracy, of the country's young manhood offered to the cause of liberty.

Quentin visited France in 1909. A letter written to an old teacher at that time shows his boyish interest in flying (he was eleven years old): "We were at Rheims and saw all the aëroplanes flying, and saw Curtiss who won the Gordon Bennett cup for swiftest flight. You don't know how pretty it was to see all the aëroplanes sailing at a time. At one time there were four aëroplanes in the air. It was the prettiest thing I ever saw. The best one was a monoplane called the 'Antoinette,' which looks like a great big bird in the air. It does not wiggle at all, and goes very fast. It is awfully pretty turning." And at the close of the letter, "Tell S—— that I am sending him a model of an aëroplane that winds up with a rubber band. They work quite well. I have one which can fly a hundred yards, and goes higher than my head."

When he was in training at Mineola, he often chose the air above his home at Sagamore Hill to practice his most startling maneuvers, his father never being sure until afterward that the army plane which had so thrilled them was Quentin's.

When the news of the boy's probable death came from France, Roosevelt, who had been sorrowing that he could not personally be on the western battlefront, dauntlessly gave answer: "Quentin's mother and I are very glad that he got to the Front and had a chance to render some service to his country, and to show the stuff there was in him before his fate befell him"

Courtesy of Underwood and Underwood

THE HOME AT OYSTER BAY AND AËROPLANES WHICH DROPPED WREATHS OF MOURNING

The story of Roosevelt's life is told, and we realize that his spoken and written words have often stood concrete results of his own vivid experience as boy and man. Those who know the facts will recognize the following as autobiographical: "I would order them [young men] to work . . . I would teach the young man that he who has not wealth owes his first duty to his family, but he who has means owes his to his State . . . I would preach the doctrine of work to all, and to the man of wealth the doctrine of unremunerative work."

"Of course, what we have a right to expect of the American boy is that he shall turn out to be a good American man. Now, the chances are strong that he won't be much of a man unless he is a good deal of a boy. He must not be a coward or a weakling, a bully, a shirk, or a prig. He must work hard and play hard. He must be clean-minded and clean-lived, and able to hold his own under all circumstances and against all comers."

"In life as in a football game, the principle to follow is: Hit the line hard; don't foul and don't shirk, but hit the line hard."—From "The American Boy," 1900.

In such plainly spoken words as these the spirit of Roosevelt will live for innumerable future generations of Americans.

Among all his messages perhaps none is more important in the light of the present speed at which civilization is having to settle difficult issues, than the following so often quoted from *The Strenuous Life:*

"In speaking to you, men who preëminently and distinctly embody all that is most American in the American character, I wish to preach, not the doctrine of ignoble ease, but the doctrine of the strenuous life, the life of toil and effort, of labor and strife; to preach the highest form of success which comes . . . to the man who does not shrink from danger, from hardship, or from bitter toil, and who out of these wins the splendid ultimate triumph. . . . As it is with the individual, so it is with the nation . . . If we are to be a really great people, we must strive in good faith to play a great part in the world. We cannot avoid meeting great issues. All that we can determine for ourselves is whether we shall meet them well or ill. The twentieth century looms before us big with the fate of many nations. . . . If we shrink from the hard contests where men must win at hazard of their lives and at the risk of all they hold dear, then the bolder and stronger peoples will pass us by, and will win for themselves the domination of the world. . . . Let us shrink from no strife, moral or physical, within or without the nation, provided we are certain that the strife is justified, for it is only through hard and dangerous endeavor, that we shall ultimately win the goal of true national greatness."

Courtesy of Brown Bros.

ROOSEVELT OVERLOOKING OLD ROME

"The man who works, the man who does great deeds, in the end dies as surely as the veriest idler who cumbers the earth's surface; but he leaves behind him the great fact that he has done his work well. The Roman passed away exactly as all the nations of antiquity which did not expand . . . ; but their very memory has vanished, while he himself is still a living force throughout the wide world in our entire civilization of today. . . ."—From Roosevelt's address on "National Duties."

There is good evidence that no human beings of recent times have surpassed in intellectual powers various personages of the old Greek and Roman civilizations; it may be that even the distant future will hold no greater geniuses than the world already has known. On the other hand, the future promises to bring rapid evolution in human society and organization of state: there is distinct prophecy in Roosevelt's example and urging toward loyalty, morality and coöperation, in social and political relations, both national and international. Roosevelt stood strongly for the "League of Nations"

Has Progressive Evolution Come to an End?

LIMITS OF PHYSICAL AND INTELLECTUAL EVOLUTION OF MAN—THE FUTURE MAY HOLD NO RACE OF SUPER-MEN, BUT IT IS LIKELY TO PRESENT A SUPER-STATE AND A SUPER-CIVILIZATION

By EDWIN GRANT CONKLIN

Professor of Biology, Princeton University

THE term "evolution" is used in several senses. When considered in its larger aspects, as for example with respect to the increasing complexity of organization in the succession of life forms upon the earth, we are dealing with what may be called progressive organization or organic progress. When considered from the standpoint of increasing diversification, as shown in the appearance of varieties and species which are no more complex in organization than the forms from which they sprung and which may be even less complex, we have a type of evolution which is not progressive and which may be called speciation or diversification. A third aspect of evolution is that which deals with increasing adaptation to conditions of life and which may be called progressive adaptation; this may or may not be associated with progressive organization or with speciation.

Organization, of whatever kind, means differentiation and integration, specialization and coöperation, diversity and harmony. Progressive evolution invariably and inevitably means increasing differentiation and integration. In the long history of life upon the earth, organisms have varied in every possible way, they may be said to have made millions and millions of experiments in finding the path of progressive evolution, and in every instance this path has been in the direction of greater specialization and coöperation.

Millions of years ago unicellular organisms reached the utmost limits of the differentiations which were possible within a single cell. Thereafter a new path had to be found if further advance in organization was to occur. This new path was found in the direction of multicellularity. Multicellular forms did not arise by the coming together of separate cells, as is sometimes assumed, but rather by the failure of cells to divide completely; when the original cell divided, the products no longer moved apart as separate and complete individuals but remained attached to one another, and instead of restoring all missing parts as each cell did when it became a separate and complete individual, the initial differences between cell products were preserved and increased at successive divisions. In this way entire cells became new units of differentiation and at the same time all the cells remained bound together into a unit of a higher order.

A wholly similar process of differentiation by cell formation takes place in the development of the egg; if cell formation is stopped in this case, differentiations never go beyond a stage comparable with those of the unicellular organism, and if the different cells fail to stick together they generally lose many of their differentiations and revert to the simpler organization of the egg. Whenever a complex protozoan divides, it goes back in organization to a more primitive condition, and after division it starts to differentiate over again; and so successive generations of protozoans make little or no advance in organization. But when the cells of a multicellular animal or plant divide they do not go back to the stage of differentiation of the egg but preserve the differentiations which they have al-

ready attained and continue to augment them during the process of development. In multicellular organisms this increasing differentiation of the cells is made possible by the close union and interdependence of the cells, whereas in the unicellular forms the very independence of the cells prevents increasing differentiation.

In a manner wholly similar to the case of the one-celled forms multicellular organisms reach a stage of differentiation beyond which they cannot go within the limits of a single body. The very nature of differentiation signifies limitations in certain directions in order to secure further development in other directions. If a creature have wings it cannot also have hands (except in the case of the angels); if it have limbs for running it cannot also have limbs for swimming; if it have enormous strength it cannot also have great delicacy of movement. Thus while certain animals are differentiated in one direction and others in another, no one animal can be differentiated in all directions. In man differentiation has gone farthest in the structures and functions of the brain. In many other respects man is relatively undifferentiated; his limbs, hands and feet, his teeth and alimentary tract are far less highly differentiated than are these organs in many other animals, but his brain is much more highly differentiated. This very fact of a highly specialized nervous system and a generalized condition of many other organs has led to the wonderful intellectual and social evolution of man and has made possible not only the rational control of his own evolution but also the control of his environment.

Path of Social Evolution

Just as the multicellular condition permits a higher degree of organization than is possible in the unicellular, so the union of multicellular organisms into a unit of a higher order opens up a new path of evolution and progress. But here also, as in the former instance, the principles of progressive evolution are increasing differentiation and integration. In this way biological colonies or societies are formed, and in various animal societies one can trace the stages of social evolution from a condition in which all the individuals are much alike and the bond of union between them is a very loose one, to such societies as those of ants, bees, and termites in which the differentiations and integrations of individuals have gone much further even than in human society. We do not know whether progressive evolution of such animal societies has already reached its limits in colonies of ants and termites, but we do know that further evolution, if it occurs, must involve a still greater degree of differentiation and integration of individuals or of colonies.

Path of Intellectual Evolution

Meanwhile man has entered upon a new path of evolution, namely, the intellectual and ethical, and just as there was a great forward movement when the path of multicellularity was taken, and again when social organizations took the place of solitary individuals, so human advances in the path of intelligence and morality are perhaps the most significant in the whole range of organic evolution. Here, as in the cases of physical and social evolution, the factors or elements out of which the new organization is builded are present in the lowest and simplest forms of life, but it is only by the progressive differentiation and integration of these factors that progress is achieved.

The elements out of which the psychic faculties of man have been developed are present in all organisms, even in germ cells, in the form of sensitivity, tropisms, reflexes, organic memory, and a few other factors; in more complex animals these take the form of special senses, instincts, emotions and as-

sociative memory; and in the highest animals, and especially in man, they blossom forth as intelligence, reason, will, and consciousness. All stages of this development may be seen in various animals below man and also in the development of the human personality from the germ cells.

No one knows whether human beings have already reached the limits of development of their intellectual, rational, and volitional powers. It is customary to assume that there is no limit to the possibilities of development in this direction, and certainly in the knowledge of and control over natural phenomena the most striking progress is now being made, chiefly, however, by coöperative effort. But this is not the question involved when we ask whether man has already reached the highest possible development of his intellectual and rational powers. There is good evidence that no recent human beings have surpassed in such powers many men of the ancient Greek race or many other individuals who have appeared in the past. Perhaps the intellectual evolution of man has already reached its climax in these greatest personages of history, so that even in the distant future there may never appear greater geniuses than Socrates, Plato and Aristotle, than Shakespeare, Newton and Darwin.

Path of Rational Coöperation

Finally, a new path of evolution has been found by man in rational coöperation, that is in the further development of human society on a basis of intelligence rather than of instinct. Certainly in this direction the limits of human evolution have not been reached; indeed, it may be said that the rational evolution of society has barely begun. It is a notable fact that the social evolution of man is going forward at a very much more rapid rate than his physical or intellectual evolution.

In bodily structure and in intellectual capacity man has changed but little since the beginnings of recorded history, but in social organization the most enormous advances have been made, and changes are still going on at a rate which is amazing if not alarming. The chief causes for this difference in the rate of physical and social evolution are to be found in the fact that individual experiences are more quickly and permanently impressed upon the intellect than upon the body or the instincts, and especially in the fact that through intelligent society past experiences are transmitted to future generations, each generation, as it were, standing upon the shoulders of the preceding one, whereas the physical man begins his development anew in each generation from the germ cells, and if he inherits any bodily features due to the experiences of his ancestors, a thing which seems most doubtful, they are very few and rare.

Progress Has Ceased in Many Lines

There is no probability that future evolution will develop more complex animal or plant cells than those which now exist or have existed in the past;[1] there is little likelihood that more complex multicellular forms than those which have lived or are now living will ever be evolved, for apparently the limits of complexity within a single cell or body have already been reached. Doubtless, both cells and bodies will continue to undergo changes which on the whole will lead to better adaptations to existing conditions, but such changes probably will be relatively slight as compared with the great evolutionary

[1] Among animals no new phyla have appeared since the vertebrates in the Silurian, or perhaps even earlier; no new classes since the mammals in the Triassic and the birds in the Jurassic. In the evolution of animals only about fourteen times in the whole history of life have new phyletic paths been found and several of these were blind alleys which led nowhere. The climax of the progressive evolution of fishes was probably reached in the Devonian, of amphibians in the Permian, of reptiles in the Mesozoic. In all these classes the formation of new species has been going on more or less continuously, but progressive evolution in the sense of increasing complexity of organization has reached or passed its climax.

advances of the past; protozoa will still remain protozoa and man will still be man.

There is no evidence and little probability that a higher animal than man will ever appear on this planet. To a larger extent than in the case of any other creature man controls his destiny, and even if the human race should become extinct, from what other existing group of organisms is it conceivable that a higher type could arise? There are other animals which in certain respects are more highly developed physically, there are social insects which in some regards are more highly developed socially, but no other animal approaches man in intellect and probably none will ever surpass him in the combination of physical, intellectual, and social capacity.

Furthermore, there is no present reason for supposing that in the future man will be more highly organized physically or will be endowed with greater intellectual capacity than have been many individual men of the past or present, though in both body and mind he will probably become better adjusted to conditions of life. It is conceivable that further evolution of the brain of man may occur, just as it is possible to conceive of a further evolution of the neck of the giraffe or of the trunk of the elephant, but there is a limit to increasing specialization beyond which it is not practicable to go. It is doubtful whether the brain of man could undergo much further differentiation without introducing disharmonies within the organism or with the environment, and the facts that since the beginnings of human records there does not appear to have been any appreciable growth of the brain in size or complexity, and that since the ancient Greeks there has been no appreciable increase in the intellectual capacity of man, plainly indicate that the possible limits of evolution in this direction have been reached. The most that can be hoped for by the scientist is that the standards of races as a whole may more nearly approach the best individual standards which now exist, and under a wise system of eugenics and education this improvement can be effected.

Paths of Future Progress

On the other hand, there is good evidence that in social organization and in coöperative efforts the limits of human evolution have not been reached. The future may produce no super-men but it is likely to produce a super-state and a super-civilization.

Progressive evolution, then, has proceeded along several lines and not along a single one; it may be represented, not by a ladder, but by a branching tree in which growth has ceased in certain branches but is still going on in others. In man there have been three main lines or branches of evolution,—physical, intellectual, and social,—but in all lines progress has meant increasing differentiation and integration. Furthermore, the directing and regulating principles may be the same in all of these lines; it may be, for example, the survival of the fittest, but there are many kinds of fitness. Physically, the fittest is the most viable; intellectually, it is the most rational; socially, it is the most ethical. These three lines are not necessarily antagonistic, as Huxley supposed, but all three may and do coöperate in such a way that each strengthens the other. Least of all is there any justification for the views of Bernhardi and other biological militarists that the most powerful, combative, and dominating are the fittest socially. Darwin himself long ago protested against this mistaken conception of natural selection and showed that in social evolution the most ethical is the most fit.

But while these different lines of evolution are not necessarily antagonistic, it is important to remember that all life processes, including evolution,

are balanced as it were between contending forces. Life itself as well as evolution, is a continual adjustment of internal conditions to external conditions, a balance between constructive and destructive processes, a combination of differentiation and integration, of variation and inheritance, of the needs of the individual and of those of the species. And in addition to these conflicting relations we find in man the opposition of instinct and intelligence, of emotion and reason, of selfishness and altruism, of individual freedom and social coöperation.

The past evolution of man has occurred almost entirely without conscious human guidance; but with the appearance of intellect and the capacity of profiting by experience, a new and great opportunity and responsibility have been given man of directing rationally and ethically his own evolution. More than anything else, that which distinguishes human society from that of other animals is just this ability to control instincts and emotions by intelligence and reason. Those who maintain that racial, national, and class antagonisms are inevitable because they are instinctive, and that wars can never cease because man is a fighting animal, really deny that mankind can ever learn by experience; they look backward to the instinctive origins and not forward to the rational organization of society. We shall never cease to have instincts, but unless these are balanced and controlled by reason, human society will revert to the level of the pack, or herd, or hive. The foundations of human society are laid in gregarious instincts, but upon these foundations human intelligence has erected that enormous structure which we call civilization.

Can there be any doubt that, if the evolution of human society continues in the future, it will bring into one organization larger and ever larger numbers of men until perhaps it may finally include the whole human species, and that it will at the same time lead to greater specialization and more intimate coöperation of all its members? As the union of many cells into one body, the union of many persons into one colony, the union of many colonies into one nation have marked great advances in evolution, so, let us hope, the union of many nations into one league may mark the next great step in human progress.

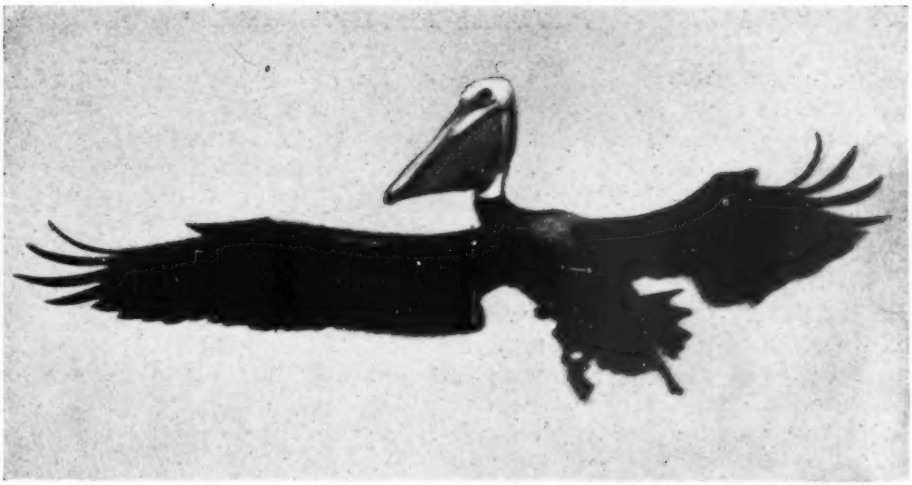
Finally, with the development of intelligence and of rational society we reach in human evolution the highest stage of organization which has ever been attained and, so far as we can now see, the highest attainable, for we have here not merely the differentiations of the human body and the countless differentiations of human society but much more we have the control over environment and the forces of nature which makes man the most powerful and speedy of all living things whether on land, in water, or in the air; which gives him a keenness and range of sensation that are unparalleled elsewhere, and which practically extends his nerve connections to all parts of the earth. Man has indeed by means of intelligence added to his own personal powers the powers of nature. His evolution is no longer limited to his body but takes in the whole of his environment.

This new path of progressive evolution is in all respects the most important which has ever yet been discovered by organisms. The course of progress has led from smaller and simpler units to larger and more complex ones until now, by means of rational coöperation, we have governmental units which include as much as one fourth of the entire human species, we are on the eve of bringing together into some form of league or federation all the nations of the world, and we are in process of annexing to our own personal powers the illimitable forces of the universe.

Photograph by Alfred M. Bailey

THEIR INTERESTS ARE SAFEGUARDED BY UNCLE SAM

Now and then a cry is heard that birds are injurious to man's interests and should be killed. For example, this last summer great pressure was brought to bear on the United States Food Administration to destroy all the pelicans in the Gulf Coast region, especially those on the coasts of Florida and Texas, because of the claim that they "existed by millions" and were daily eating "hundreds of thousands of dollars' worth of food fish." The Food Administration asked the writer to investigate this. With the kind cooperation of State Fish Commissioner Woods, of Texas, Conservation Commissioner Alexander, of Louisiana, and Shellfish Commissioner Williams, of Florida, I was able to cruise the coasts of these states and visit all the breeding colonies of pelicans. We counted and estimated their numbers, and gathered quantities of the food which the adult and young alike disgorged in the writer's presence. At the conclusion of the investigation it was found that only about 65,000 adult pelicans were inhabiting the Gulf Coast of the United States in the summer of 1918, and that more than 95 per cent of their food during the month of June consisted of menhaden—fish never used for human consumption



Photograph by Alfred M. Bailey

Brown pelican flying above its home colony on the United States Bird Reservation locally known as "Mud Lumps," at the mouth of the Mississippi River

Wild Life Conservation Along the Gulf Coast

FLORIDA, ALABAMA, MISSISSIPPI, LOUISIANA, AND TEXAS IN BIRD PROTECTION, THE FIRST WITH MISSISSIPPI A NATIONAL SHAME, LOUISIANA A NATIONAL PRIDE

By T. GILBERT PEARSON

Secretary of the National Association of Audubon Societies

NO area of like extent in the United States is so memorable from the standpoint of wild life conservation as that region which we may designate as the Gulf Coast.

Beginning with the mouth of the Rio Grande, this area sweeps northward, eastward, and then southward for fourteen hundred miles until we reach the far-famed bird islands of the Dry Tortugas off the south end of Florida. This region, with its shallow seas, islands, sand beaches, and extensive marshes, has for ages been the abode of innumerable water birds that have long attracted the avarice of mankind.

Thirty years ago, when bird killing for the feather trade was at its height, one could have found a dozen vessels at once cruising the Florida coast in quest of the vast assemblages of gulls, terns, egrets, and shore birds which at that time inhabited the mangrove islands and coral reefs. Similar killing went on elsewhere along the Gulf Coast at that time. The egging business also flourished in those and even later days.

In 1904, Mr. Frank M. Miller, of New Orleans, reported that five thousand eggs had just been broken on one of the Louisiana islands inhabited by sea birds, in order that all the eggs gathered the next morning might be fresh ones. For years cargoes of eggs taken in this manner were supplied to the markets of New Orleans. He stated further that at least fifty thousand eggs were that year taken and used in the manufacture of glue.

Along the Louisiana coast from the Mississippi River westward to Texas, there extend vast salt marshes varying in width from five to thirty miles. This extensive domain, which the land has as yet only partly reclaimed from the sea, is the winter home of myriads of ducks and geese. To this region

were attracted thousands of hunters, who, until recent years, shot unrestricted the wild fowl that gathered here in winter to feed and rest. The markets of the Louisiana cities were open to the sale of the bodies of these birds, and enormous numbers were shipped to northern markets.

The first serious attempts to protect the wild life of the Gulf Coast were made by the National Association of Audubon Societies. As far back as 1902 these societies were conducting campaigns of education and seeking to arouse among the people of that region an interest in conserving their wild bird life. These efforts have continued through the years, but have produced little effect in much of the territory, and pronounced hostility has been encountered in many regions. Thus on July 14, 1905, Guy Bradley, the Association's warden near Cape Sable, Florida, was shot by plume hunters and the birds in the colony he guarded were destroyed. Later, up in Charlotte Harbor, Florida, on November 30, 1908, Columbus G. McLeod, another Audubon warden, was killed and the boat in which his body fell was sunk with sandbags.

The Association has worked systematically for the establishment of state game warden systems in the various states bordering on the Gulf, but with only moderate success. In 1913 the legislature of Florida finally enacted a law providing for a state game warden and deputies. Two years later the law was repealed. Florida stands today as the Rip Van Winkle state in the matter of wild life conservation. The state's efforts to protect its wild life have been practically nil.

To the westward lies Alabama with a short coastline, and inhabited by comparatively few shore birds. The subject of bird and game protection was taken up by the Honorable John H. Wallace, in February, 1907, and since that date this active officer has done much to conserve the bird life for his state.

Passing on to Mississippi, we find the only state in the Union, aside from Florida, that makes no declared effort through state officers to enforce its laws for the protection of wild life. Two years ago the legislature passed a bill to establish a game commission, but the courts declared it unconstitutional, and Mississippi hunters kept merrily on as heretofore, killing very much when and where they pleased.

In regard to Louisiana the story is a long one, if one should undertake to tell it all. Mr. Frank Miller, backed by the National Association of Audubon Societies, secured the establishment of a number of Federal bird reservations off the coast, and in July, 1908, induced the legislature to create a "Board of Commissioners for the Protection of Birds, Game and Fish." He was appointed chairman of the board, and undertook the great work of conserving the wild life of his state. In due time his political life came to an end. Under the leadership of the present game commissioner, the Honorable L. M. Alexander, Louisiana has made notable strides in the protection of its wild life, and considering the conditions which he found when entering office, about six years ago, no state in the Union can equal his record.

During the winter Louisiana contains more wild waterfowl than any other two states in the Union, and here also there are surely as many gunners to the square foot as can be found anywhere on this continent. Yet Mr. Alexander has secured the enactment of reasonable and necessary conservation laws and he enforces them with a tact and wisdom that are most stimulating.

Aside from the Government bird reservations, the Audubon Societies' islands, and the work of the Louisiana Game Commission, mention should be made of the three large tracts of marshland set aside as bird refuges. One of

these, Marsh Island, 77,000 acres in extent, was purchased by Mrs. Russell Sage, and set aside as a bird sanctuary. This was in 1912. Two years later the Rockefeller Foundation purchased a tract of 86,000 acres a few miles to the west of it, and declared it to be a bird sanctuary for all time. Mr. Edward A. McIlhenny, who was responsible for both of these purchases, together with Charles Willis Ward, bought and set aside another reservation of 57,000 acres of marshland. These three tracts, carefully guarded at all times, constitute the most important refuges for wild life in the southern states.

Thus Louisiana, at one time a slaughter pen for wild life second only to the state of Florida, is today occupying an enviable position among the states that are intelligently conserving their wild life.

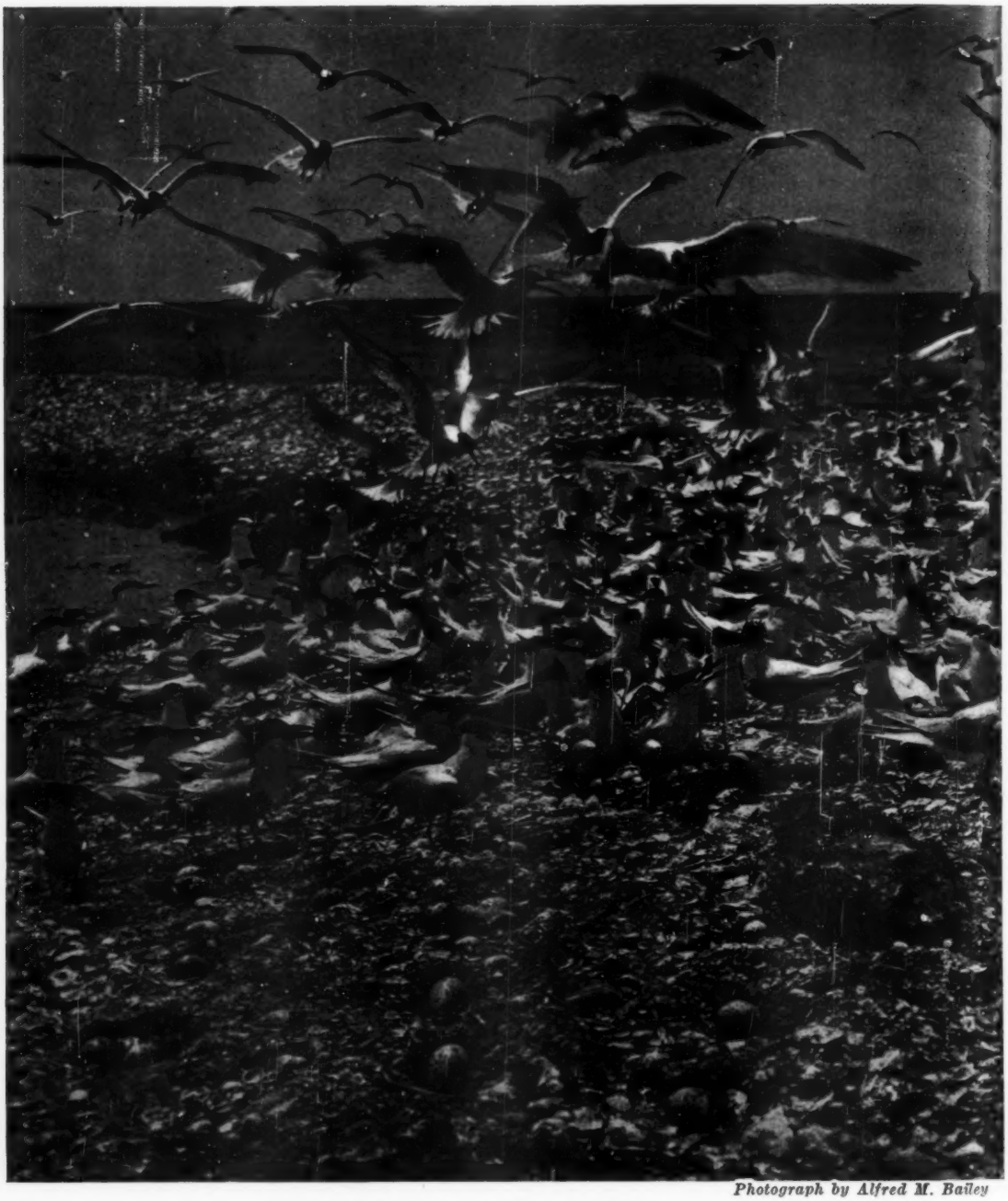
There remains but one state along the Gulf Coast to mention, that is Texas. From the standpoint of the sea-bird life, which consists of gulls, terns, herons, and pelicans, this region is today not an important one, for the bird life that was once abundant has been reduced to extremely small proportions, and the state has done little to stay the hand of the gunners.

Few birds along the Gulf Coast are now killed for the feather trade, with the exception of the egrets. Thanks to the wardens of the Audubon Societies and the Louisiana conservation guards, egging as a business is a thing of the past, and as we have already seen, the killing of ducks in their winter haven, Louisiana, is now carefully regulated.

It was shown that one more silly prejudice against our wild life was without foundation when, this summer, the food of the brown pelican was investigated at the request of the United States Food Administration (for details see page 40). As I sailed along parts of the Gulf Coast where twenty years ago water birds were found by tens of thousands and saw how scarce, in many regions, they are today, I was impressed anew with the possibility of destruction which man may work with the helpless wild life of a country, and I felt again how tremendously important it is that the present generation should do all within its power to save the remnant of the wild life along our beautiful southern coast.

Photograph by Alfred M. Bailey

Mr. T. Gilbert Pearson, secretary of the National Association of Audubon Societies, making a practical investigation of the food of the brown pelican (compare with photograph, page 61). For details regarding the recent demand of fishermen for the extermination of the brown pelicans, and the results of the investigation by Mr. Pearson, see page 40



Photograph by Alfred M. Bailey

SUMMER "SNOW FIELDS" OF TERNS

The Cabot terns (*Sterna sandvicensis acuflavida*) are smaller than the royal terns, more slender and graceful, and of a more affectionate disposition with one another. They are beautiful birds with silver-pearl wings, eyes of piercing blackness, crests of jet, and dark bills tipped with yellow—truly little "doves" of the sea.

These terns have been especially persecuted in the past by the feather hunters and had become almost extinct when Louisiana, in conjunction with the Federal Government, the National Association of Audubon Societies, and various private individuals interested in bird protection, undertook to conserve the state's bird life on an extensive scale. Bird refuges have now been established throughout Louisiana and on the outlying islands, and a state board of commissioners[1] has been inaugurated to promote the protection of wild life. During the winter Louisiana is a haven for more water birds than any other two states of the Union, and in recent years she has occupied the enviable position of being one of the most conscientious protectors of her feathered guests

[1] See note at bottom of following page.

Observations on the Water Birds of Louisiana[1]

By ALFRED M. BAILEY

Of the Louisiana State Museum, New Orleans

LOUISIANA is so situated geographically and has conditions so favorable for bird life that she stands foremost among the bird states of the Union. The great hordes of wild fowl from the frozen North, using the Mississippi Valley as a migration route, find a place of refuge and a source of food supply that have no equal in any other state, and each spring when these winter guests again return to their nesting grounds at the North, veritable "snow fields" of white-winged terns and other beautiful sea birds arrive from farther south to take their places as her summer residents.

In years gone by, this state was the slaughter ground of the plume and wing hunters, but today Louisiana has under her protection more than three hundred thousand acres of land and salt marsh given over entirely as places of refuge for wild life. Wardens patrol these areas continually, so that the large numbers of waterfowl shall be unmolested.

Among early attempts at conservation in Louisiana was that of Mr. E. A.

[1] Illustrations from a series of remarkable bird photographs by E. A. McIlhenny, Stanley C. Arthur, and Alfred M. Bailey.

NOTE.—This state board is at present under the leadership of Mr. M. L. Alexander, and is doing a good work. Game laws are not sufficient. Public sentiment has a great deal to do with enforcing laws, and the State Department of Conservation and the Louisiana State Museum have been conducting an educational campaign by means of motion pictures and exhibits of wild life showing economic and æsthetic values. In a state so cut up with waterways and impassable swamps, it would be very difficult to protect all places desired without this aid from the people as a whole. To carry on the work the department has eighteen patrol boats and a force of more than one hundred men. The men chosen for the work are those who chance to have their homes in the area to be protected. They are therefore familiar with the conditions of the region and are able to be on hand at all times.

McIlhenny, the well-known sportsman and conservationist, when he started his famous Avery Island heronry. This wonderful bird paradise is on a little pond of scarcely two acres, which was made by damming a small creek. Nesting places were provided by planting scrub willow and buttonbush. In the swamps near by, Mr. McIlhenny captured eight snowy herons, or egrets, a species which was at that time nearly extinct in this state because of the ravages of the plume hunters. During the summer and fall months he kept these egrets in captivity along the edge of his little pond. He visited them daily and they soon grew tame. When the other birds started their return south Mr. McIlhenny gave his pets their liberty. They stayed around the pond for several days and then joined the others on their southern journey. In the spring, however, five birds returned and two pairs built their nests in the scrubby trees and reared their young in safety. That fall eleven of them migrated to their southern home; nine returned in the spring, and several young were raised.

To increase the number of egrets Mr. McIlhenny resorted to many experiments. As the little blue herons lay eggs similar to those of the egrets and as their young are also white, he transferred egrets' eggs to the herons' nests. When the egrets missed their eggs, they again laid, so that two broods were obtained in place of one.

From that time on these snowy herons increased rapidly. Other species joined them until today the little pond has a wealth of bird life that can be equaled by few other places of similar size.

I had heard of this little haven for birds many times and expected to find a wild, inaccessible swamp, but contrary to my expectations, I found the heronry snuggling at the foot of the rolling hills of Avery, a most unnatural place for birds,—for there is a factory within one hundred yards, with busy factory folk hurrying to and fro, and a railroad runs along the edge of the pond, the birds nesting within thirty feet of it. Indeed, the birds do not even rise as the trains go by. And these are the same birds that go out daily to feed in the swamps and there will not allow man to approach closer than several hundred yards. Such is the response of birds to protection!

On the great wild fowl refuges of Louisiana a development of natural colonies is going on under the protection afforded. These areas are carefully guarded and thousands of black mallards and other summer birds breed here each year. The last stand of the roseate spoonbill in Louisiana is in the western part of the state at Cameron Parish, truly a wonderful sight in June when we visited it—and yet pitiful. We traveled along the Intercoastal Canal to Black Bayou, a weird, beautiful stream with its gnarled, moss-hung cypresses, and paddled down the little side stream in pirogues. We counted 287 spoonbills clustered in the tops of the cypress trees, their pink colors showing against the green with all the freshness of peach blossoms in springtime. These few birds are all that are left of the large colonies which once gave color to the southern swamps.

The year 1917 was very dry, and the spoonbills did not nest along the bayou, but they were building during our visit, and it is reported they had a very successful season. Their warden was formerly a market shooter and alligator hunter—yet he efficiently protected the birds, and although he could neither read nor write, he could obey orders. One day some men came down from a town near by to "shoot out" the birds as they had been accustomed to do. As they were approaching, the warden paddled up in his pirogue, shoved his gun in the ribs of the nearest man, and then asked their business. They "allowed" they were going to kill

Photograph by Alfred M. Bailey

THE DOWNY YOUNG OF THE CABOT AND ROYAL TERNS

The royal terns (*Sterna maxima*) nest so close together that it would seem no space can be found for another bird, yet the birds seem to have not the least doubt as to which eggs are their own. They lay one egg only, either in a shallow pit or on the bare sand, and both parents take turns incubating. The eggs are variously mottled and the young birds are just as varied in their markings. This speckled coloration renders them inconspicuous on the shell-strewn gravel banks. When very small the young terns crouch close to the shell to avoid detection; fifteen newly hatched royals can be counted in the space in the foreground of this photograph

Photograph by Stanley C. Arthur

The skimmer (*Rynchops nigra*) is perhaps the most interesting species breeding on the shell keys of Louisiana. Great bands of these solemnly dressed birds stalk gravely along the shell and then rise and wing away with a peculiar erratic flight, swinging here and there, and calling out monotonously. They are very conspicuous against the ground and show up plainly on the nest, but sometimes in flight the whole flock will disappear from view, for their wings are margined with white and may blend with the colors of the sky

Photograph by Alfred M. Bailey

The young skimmer when crouching in the sands looks not unlike a young tern. It has the upper and lower mandibles of about the same length (compare with adult skimmer above). These birds nest in large colonies on all the "outside" islands of the Gulf Coast, choosing the exposed beaches as the proper place to deposit their three or four protectively mottled eggs in a mere scoop in the sand

a few birds, but Buck thought otherwise and proceeded to read the law to them. He said that he had been commissioned to "run-hell-out-of" anyone coming in there, and he was going to do it. Under the circumstances, the men decided to leave the birds unmolested.

In the last few years I have observed a great increase in numbers of the wild fowl which swarm along the Gulf Coast, and all the men living in that region say the same. In fact, the geese and ducks were in such hordes in 1917 that they inflicted serious loss on the rice farms of Cameron Parish. The ground was white with thousands of snow geese, and clouds of ducks poured into the fields. It is a sight that makes a bird lover happy—even though the rice farmer does not appreciate the beauty of it. The great "pastures" of the gulf, wide-stretching prairies, are the feeding grounds of a multitude of blue geese, Canadas, and white-fronted geese. I witnessed a flight of blue geese that I shall never forget—and yet the old-timers of Louisiana say there are relatively only a few of the blue geese left today.

I rode on horseback late one afternoon to some fresh-water ponds near one of the Cheniers (an oak-grown ridge), and awaited the coming of the birds to their evening resting place. Before my arrival, one flock of geese had already settled, and I could hear their calls a long time before the birds came into view. When within one hundred yards of this great decoy flock, I dismounted and crawled along the edge of the little pool where I could watch them. Their white heads loomed up conspicuously against the dark background, the sprinkling of snow geese marking the size of the flock, so that I could tell how far it extended, even where I could no longer see the darker birds. They "talked" continually, and moved about from one grassplot to another.

Soon from afar I heard the echoing call of another flock of blue geese, a call from apparently all directions, clear and resonant, carrying far across the waste lands. In the gray distance, vague, wavy forms appeared, great V-shaped masses, wedging their way surely and confidently with little V's trailing from the ends of the first great band, and weaving shadowy, intricate lines across the dim lit sky.

The answering calls of the birds on the ground made a perfect bedlam, as flock after flock of calling birds circled out of the sky and joined the resting throng. There seemed to be from a dozen to fifteen flocks in a company, and as one company settled with military precision, another company would swirl in out of the grayness, while still another great horde could be heard off in the distance. I watched this continual arrival of geese for more than an hour, until it grew too dark to see, and then I still lingered for the sheer joy of hearing all those wild voices.

In the morning I saw the birds as they were leaving for the day, and again they seemed to fly in great companies, their long V-shaped flocks trailing across the sky as far as the eye could see.

These great flocks of blue geese assemble each winter on the wide-stretching prairies and the burned salt marshes along the Gulf Coast to feed on the tender shoots of the new grass. There are always a few white-headed patriarchs in the vast band which stand sentinel-like, and watch for possible disturbers. When alarmed the geese rise up in a cloud, like so many gigantic mosquitoes, and circle off a few hundred yards.

They feed during the day and at night prefer to rest in the numerous lagoons that dot the marshland. Each day great hordes arise from the feeding grounds, circle around, and then head for the shell banks to "gravel." "Hell Hole" is their favorite resort, and this

Photograph by E. A. McIlhenny

The blue geese (*Chen cærulescens*) are conspicuous among the waterfowl for their pure white heads. These geese breed in the Hudson Bay country and migrate to the southern United States during the winter months. Great flocks assemble each year along the Gulf Coast to feed on the tender shoots of the new grass and to "gravel" on the shell banks. The mouth of the Mississippi and the region around South West Pass of Vermilion Bay are the greatest blue goose sections of Louisiana

Photograph by E. A. McIlhenny

Occasionally the stock raisers of the western part of Louisiana complain that the geese injure their pasture lands, for these birds settle down in great flocks to guzzle in the mud, digging thousands of small lagoons across the fields. They are great "talkers" when flying in bands or when collected together at night, but a few white-headed patriarchs always stand as sentinels to give an alarm at the approach of any intruder. The blue geese associate freely with ducks and other species of geese (especially the snow geese), from which they differ little in habits

Photographs by Alfred M. Bailey

MISSISSIPPI "MUD LUMPS" AND THEIR SUMMER RESIDENTS

Brown pelicans (*Pelecanus occidentalis*) nest on the different islands along the Louisiana Gulf Coast, and the largest colony in the country is found on the "Mud Lumps" of the Mississippi Delta. Through the faint blue haze of the gulf one sees what appears to be wooded hills with an outspread city at their foot. On nearer approach this resolves itself into a fifteen-foot mound of mud and a row of pelicans. The soft mud underneath the tenacious river bottom of the Mississippi Delta forces up bumps in the latter and then bursts through as a mud "volcano," forming small mud islands. The "lumps" most thickly inhabited by pelicans are found off the mouth of Pass á l'Outre, where at least 50,000 birds come each year to raise their young. The outermost islands are occupied first; then, as larger numbers of birds arrive, the islands toward the shore are gradually filled up, until finally all the islands are covered with families of awkward parents and downy white youngsters. Three chalk-white eggs are laid in a rather neatly made grass nest, although on some of the mud lumps which are devoid of vegetation the nests are merely a pile of sticks clumsily thrown together. The pelican nests are at times subject to raids by raccoons; in one instance nearly one thousand nests on Grand Cochere Island were destroyed by these animals in six weeks

Photograph by E. A. McIlhenny

YOUNG ANHINGAS, OR "SNAKE BIRDS," AT HOME

The anhingas (*Anhinga anhinga*) hide their nests in secluded spots directly over the water, frequently selecting the cypresses which abound in the swamps and ponds of Louisiana. The adult birds are wonderful divers and swimmers and when frightened tumble precipitously into the water. In fishing, the anhingas do not drop on to their prey, as do the gulls, for instance, but pursue their victim under the water as it tries to hasten out of harm's way. They swim under water for long distances with only the head and lithe neck above the surface, looking not unlike some strange water serpent—in fact, they are commonly known as "snake birds."

The young are covered for the first few weeks with a buff-colored down. They have the peculiar habit (as can be seen in the photograph) of drawing themselves up from the nest by placing their bills over a convenient branch or the edge of the nest. If the young are approached, they merely cling tenaciously to the nest, and when thrown into the water are quite helpless.

For the most part anhingas eat small fish, but they will take any of the small creatures of the ponds, even young alligators and small terrapins. The adults feed the young by regurgitation

Photograph by E. A. McIlhenny

The roseate spoonbills (*Ajaia ajaja*) nest among the dense moss-hung cypresses by the lagoons and bayous near the Gulf Coast. The birds dwell near together on flat nests built with sticks of considerable size, and lay their three or four eggs about the first of June. Previous to nesting, the old birds pass through their spring molt, after which they are arrayed in a plumage of beautiful carmine and white, in marked contrast with the dark green of the cypress

Photograph by E. A. McIlhenny

The beautiful little snowy egrets (*Egretta candidissima candidissima*) were once common throughout the Gulf region, but they have fallen before the hunters of "aigrettes" for the millinery trade until now the species is on the verge of extinction. The snowy egrets start nesting late in March, building their nests in remote marshes or on the margins of lakes and ponds. Mr. McIlhenny started "Avery Heronry" with eight of these egrets on a little pond artificially prepared for them. The birds have become much attached to their nesting place, and return to the heronry year after year to enjoy its protection

Photograph by E. A. McIlhenny

The Louisiana heron (*Hydranassa tricolor ruficollis*) is the most common wader in the South. This long-necked and long-legged bird, with its beautiful colors—and its harsh squawks—nests in various heronries throughout the state and on many of the mangrove islands bordering the gulf. Being very pugnacious, it is almost a pest in some of the heronries, for it tends to drive out the more gentle snowy egret

used to be their great slaughter ground, from which fact it derived its name; for the old-timers would say, "If you want to give the geese hell, go to the gravel hole!" Now the birds may gravel in safety. For "Hell Hole" is included among the protected areas.

But if the geese are numerous, there is no word to describe the numbers of ducks that sometimes crowd these sanctuaries. Yet even with such numbers during migration, spread them over the country, as at other times of the year, and we have only too few.

Off the Louisiana coast are the famous breeding islands of the birds. A few years ago the boatmen plundered the colonies as they pleased, taking the eggs and killing the beautiful terns for their wings. Some species became so scarce as to be almost extinct in this region, but now the birds are swarming once again on these shell keys, the thousands of flashing wings lending their beauty and breaking the monotony of the wide stretches of salt marsh and shimmering gulf.

It would be hard to estimate the number of breeding birds on the islands for their habits are so varied. Close in among the salt grasses are the fork-tailed Forster's terns. These active little fellows build their nests on the dead grass piled high by the tide; and the black-headed laughing gulls and least terns find comradeship with them. Too numerous to count are the Cabot, royal, and Caspian terns nesting on the outer shell keys.

The Cabot tern is my favorite, for he is more fearless, more unconcerned, and seems to take better care of his youngsters than the other species. When we approached the Cabots, they stretched their necks to full length, with crest erect, and protested at the tops of their voices. If we came too near, they rose and drifted gracefully away, and then circled in from behind and fluttered down to protect their babies from the hot sun. One tern I watched did her best to coax her little one over the rim of the beach toward the water's edge. She would go ahead a few steps, teasing

and scolding, and then go back again as though out of patience with the wayward offspring.

Terns are ideal birds to study and photograph from a blind. They sail back to their eggs within a few feet of the photographer almost before he has had time to conceal himself. At first they are very suspicious and stand at "attention," but they soon lose their caution and devote themselves to their domestic duties.

Skimmers, too, nest on these islands by the thousands. These grotesque birds stalk solemnly along the shell keys, whole flocks of them together, their black colors gleaming in striking contrast with the sea and the sky, and their white underparts blending harmoniously with the light shell of the ground, so that their elongated form and bill seem all the more out of proportion.

The skimmers receive their name from their habit of skimming the water for food. Whole strings of them may be seen darting along, their lower mandibles cleaving the surface. They are particularly active at dusk and I believe they are more or less nocturnal for I have seen them about at all hours of the night.

The young are fuzzy little fellows and have a habit of "taking to their heels" immediately they see anyone, but they crouch down when cornered and depend upon their gray coloration to protect them. They can make a little pit in the sand in no time by using

Photograph by E. A. McIlhenny

The adults of the little blue herons (*Florida cærulea*) are dark blue, but their young are white and easily mistaken for the young of the snowy egrets. All stages of plumage are found between the adult and young, the birds of mixed colors being known locally as "crazy herons" or "calico birds" (see page 67). The herons are timorous and seclusive and their rookeries are always in the wildest and most inaccessible places. The species is still very abundant in different parts of Louisiana

their feet and breast, and when so crouching they will allow one even to step on them.

Then there are the clumsy-looking pelicans which have so aroused the wrath of the fishermen recently along the Gulf Coast. The largest colony of brown pelicans in the country is at the mouth of the Mississippi River on the United States Bird Reservation locally called "Mud Lumps." These lumps themselves are of geologic interest because of their peculiar formation, being squeezed up from under the river bottom by pressure beneath. Here fifty thousand pelicans nest with their thousands of downy young and make the "lumps" one of the most interesting places in the world.

The young when first hatched resemble little black India-rubber balls, and are extremely sensitive to the sun and therefore constantly sheltered by their parents. In a few days the white down appears and the rookery is then white as a cotton field. As soon as the youngsters are able to paddle about, they keep their parents busy fishing in order to satisfy their enormous appetites. Then there is a continuous arrival of old birds from afar; a long string of birds flying with methodically timed strokes,—a few strong beats and then a coast, each bird following the wing strokes of the leader and all scaling so close to the water that it seems they must strike the surface at every beat. And what excitement there is among the young when the old birds arrive! The white fellows follow after with anxious begging cries; the parent bird opens wide her bill and disgorges the fish, while the youngster anticipates its arrival by thrusting his head down the old bird's throat. It is amusing to see a heavy young one, weighing more than the adult, feeding this way, and the more they receive the more they beg. They flop their wobbly wings and jerk their heads back and forth, blinking their eyes, and staggering about. They often receive so many fish that the tail of the last remains in sight, and when an extra large fish is taken, its course can be followed down the skinny neck. Often they become so gorged that they sprawl over on their breasts, or flop over on their backs with feet extended in the air. At first when I walked around the rookery, I thought these stuffed fellows were dying, but when they were straightened out, they immediately disgorged and started paddling away. Those birds large enough to travel take to the water immediately on the approach of danger, and they gather in large flocks as they drift idly on the quiet water and wait until their rookery is undisturbed again.

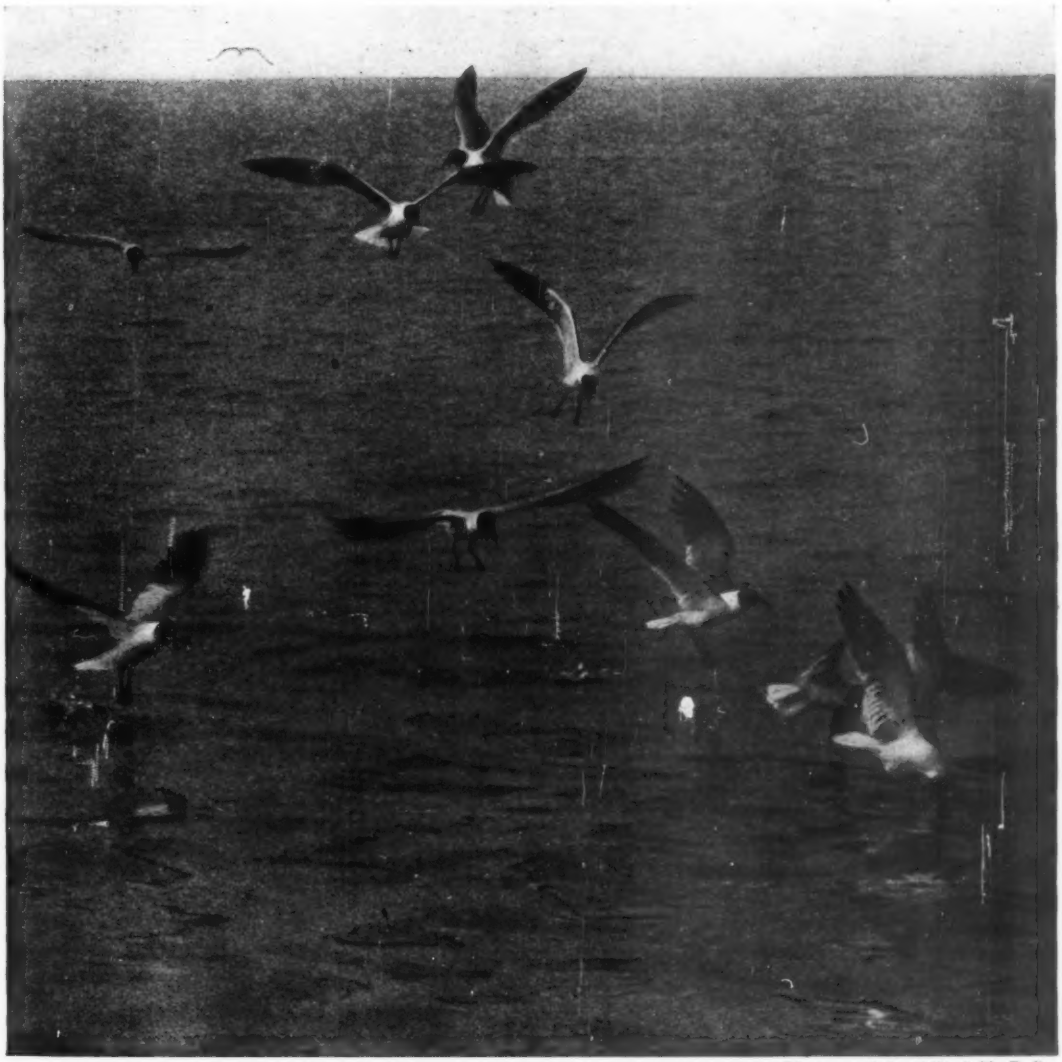
Besides the birds which make up the vast colonies, there are many other interesting species nesting in this state. The ibis, the awkward wood stork, and the beautiful roseate spoonbill are found in different parts. The anhingas choose the cypress, hiding their nests among the dense curtains of moss, and darting away at the first approach of danger. What wonderful divers they are, and how interesting their young! (See page 52.)

Louisiana is not a state of greatly diversified scenery, but she offers a beautiful contrast when compared with other states of the Union. The placid lagoons are bordered with huge cypresses and wide-stretching live oaks, all clothed with a drapery of Spanish moss. The swamps are often a jungle of tropical luxuriance, impassable because of the clinging vines. The lowlands have their fascination with their beaches and wind-blown trees, their wave-beaten palmettos, and inviting waters.

As a natural bird paradise, the state of Louisiana is admirably adapted to become a haven of refuge, which will be able gradually to send its feathered folk throughout the country to gladden the hearts of the thousands who wander out of doors.

A SERIES OF DUOTONE REPRODUCTIONS SHOWING THE PROTECTED BIRD LIFE OF OUR LOUISIANA COAST

BY ALFRED M. BAILEY



Photograph by Alfred M. Bailey

GRACEFUL FOLLOWERS OF BOATS AT SEA

The laughing gulls (*Larus atricilla*) fish far out at sea, where their cries may be heard early and late as they follow the boats for the trails of refuse. The prolonged call of the flock is the most peculiar of gull cries and not unlike harsh, derisive laughter. Fast fliers, light of wing, and keen of vision, they sail with marvelously controlled movements in graceful, clear-cut figures which make them a delight to the eye. They circle the boat round and round, without apparent wing movement; they suddenly stop in their flight to hover above the surface or to dive downward upon some scrap which they snatch as they sail past

Photograph by Alfred M. Bailey

IN THE SUNSHINE ABOVE THEIR BREEDING ISLAND

The laughing gulls are the only gulls breeding in the southern United States. In the breeding colony several hundred may nest on the same little island, choosing the mangrove and marsh-grown areas for their nests. When disturbed they rise out of the grass and hover overhead, their black and white colors in marked contrast with the blue of the water and the green of the vegetation. The long-legged young are adepts at taking care of themselves, skulking in the grass if unobserved or sprinting with great speed if in any danger

ing with great speed if in any danger

Photograph by Stanley C. Arthur

A TERN TRAGEDY

Terns' eggs are a great delicacy and very tempting to a laughing gull. The gull is more or less predaceous, and if terns' nests are left unguarded, is likely to seize the opportunity to eat the eggs or even the young. It is said that the gull may alight on the good-natured pelican's head and snatch the little fishes which escape from the huge bill as the bird drains off the gallon or more of water scooped up with the catch

Photograph by Alfred M. Bailey

GROTESQUE FISHERMEN WHO TRAVEL "BY AËROPLANE" BETWEEN THEIR VILLAGE AND THE SEA

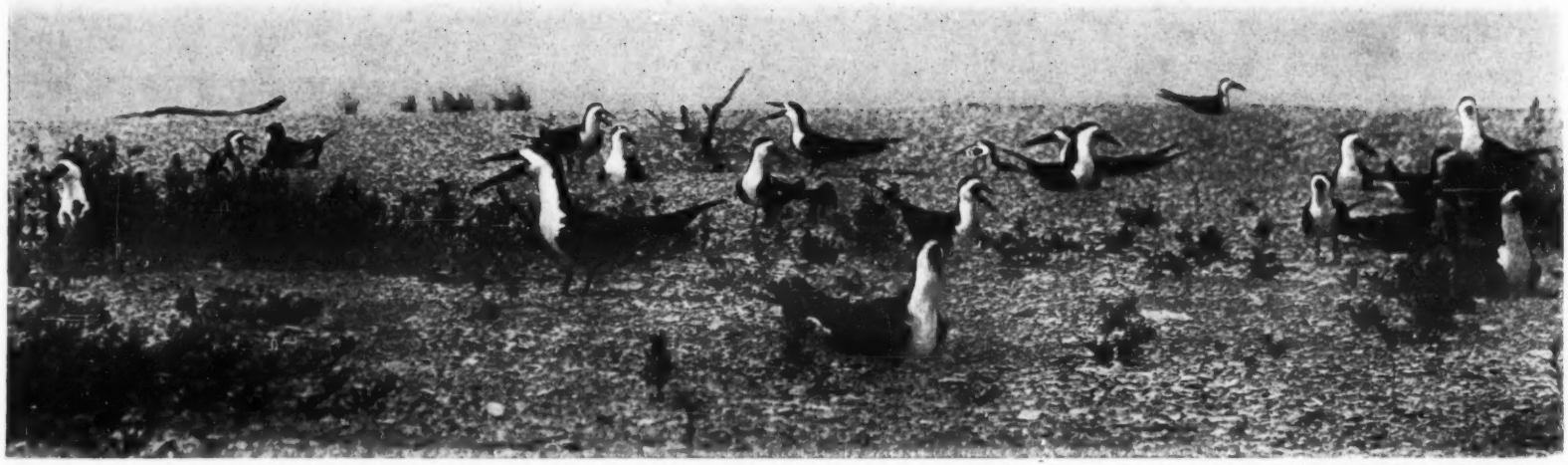
We induced the old pelicans to come close to our photographic blind after we had crawled inside, by having one of the boatmen chase the young birds near to us. The old pelicans kept eying the blind suspiciously, however, and if we made too much noise, they were off in a hurry, but after a few circles they would drop heavily among the young birds again. Pelicans are solicitous of the welfare of the nestlings and insist that they keep sheltered from the sun. If a young fellow decides to come out and enjoy the scenery, it is given a few good pecks, after which it makes all haste to take advantage of the haven offered. The birds are more or less intolerant of one another's young, and when a stranger offspring waddles in the way, it is given several good cuffs. In spite of considerable parental solicitude, however, it is not unusual to see one of the foolish old birds standing on its offspring without seeming to notice the protesting squawks

Photograph by Alfred M. Bailey

A STRANGE PERFORMANCE

The parent pelican feeds its young by disgorging partly digested food. In the evening from far out in the gulf, long lines of adult birds come winging their way with methodically timed strokes, so heavily burdened with the bony sardines they carry that they can scarcely fly. The youngster who posed for this picture was anxiously trying to go down its elder's throat after the sardines. The action is a matter of habit and racial instinct although having the appearance of intolerable impertinence on the part of the young bird. The young often receive so many fish that the tail of the last remains in sight; in fact they often become so gorged that they flop over on their backs with feet extended in the air.

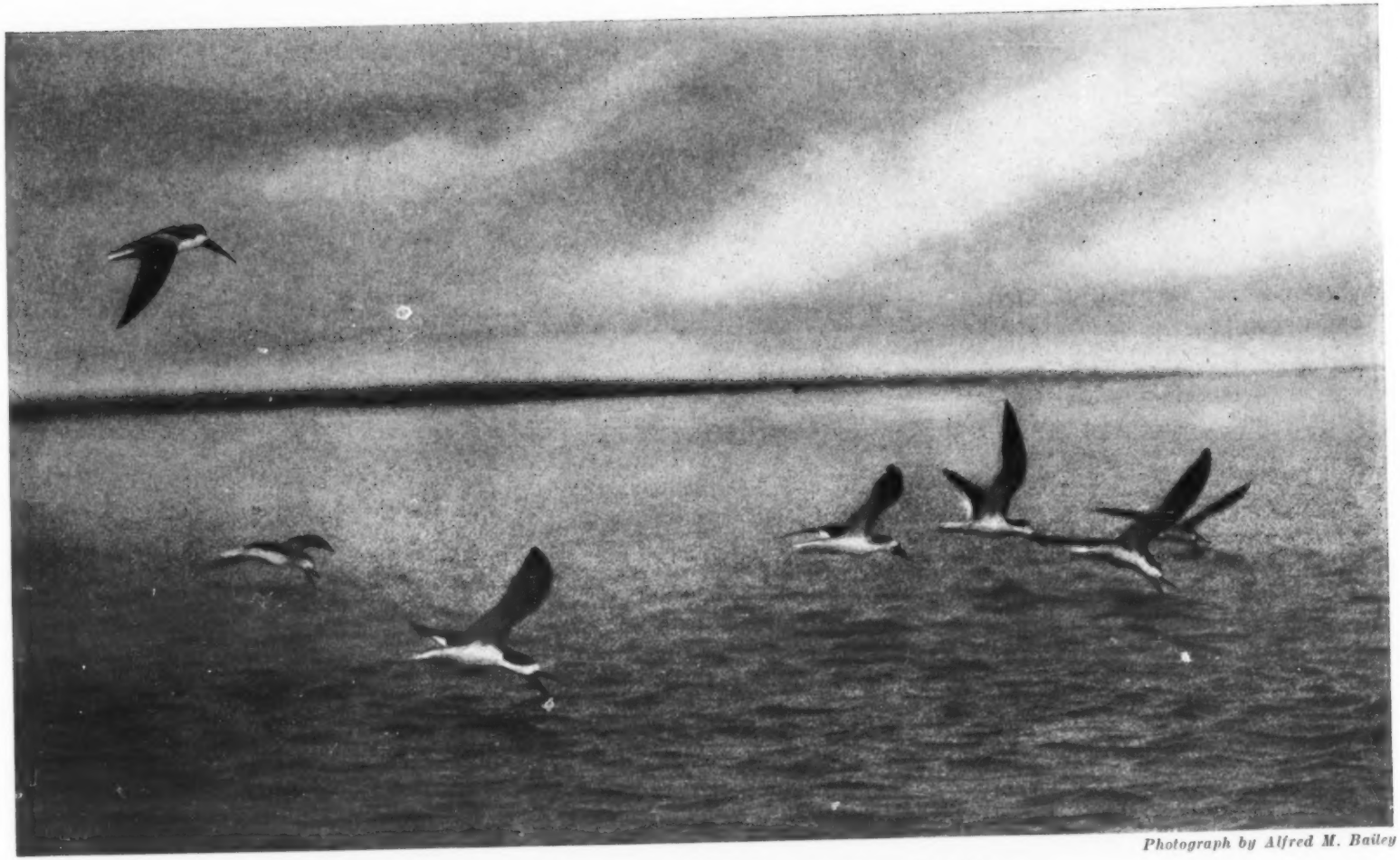
The pelicans are good natured and make fine pets. We picked up a wing-tipped bird and kept it for several days. At first it refused to eat, but finally, when it decided to accept our proffered gifts, it took fourteen catfish at one feeding. The young birds were not greatly disturbed by our intrusion and seemed to delight in running between our legs as they wobbled around clumsily with an audible pat-pat of their large webbed feet



Photograph by Alfred M. Bailey

PART OF A COLONY OF SKIMMERS IN ITS SUMMER HOME

The black skimmers rest during the day on sandy beaches along the coast and outside islands to which they give a very somber appearance as they huddle together, their jet black coats standing out against the sand like a heavy pall spread over the ground. These birds are difficult to approach for study, but they may easily be watched by using a photographic blind. They flutter down in front of the blind, eying it uncertainly, and at the first suspicious movement dart away, only to circle around a few times and return again and again



Photograph by Alfred M. Bailey

SMALL BANDS OF SKIMMERS FISH TOGETHER AT DUSK

At dusk the skimmers leave the beaches and dart along over the water, the long lower mandible just cutting the surface. The colony breaks up into small groups of a dozen or so, which cruise the waters carefully, wheeling and skimming close to the surface of the shimmering gulf as they search here and there for fish and shrimps. They are extremely noisy birds and have a rasping call that is repeatedly hurled at the intruder

Photograph by Alfred M. Bailey

BLACK BAYOU, THE LAST STAND OF THE ROSEATE SPOONBILLS IN LOUISIANA

The sluggish bayous of southern Louisiana, bordered by cypresses and live oaks gracefully festooned with trailing Spanish moss, offer havens of refuge to the numerous water birds. Deep and clear with scarcely perceptible flow, the streams maintain their undisturbed peace, protected by the surrounding jungles. Here on Black Bayou the roseate spoonbills make their last Louisiana stand, the anhingas nest among the dense curtains of moss; also here the all but extinct ivory-billed woodpeckers work at their noisy carpentry

Photograph by E. A. McIlhenny

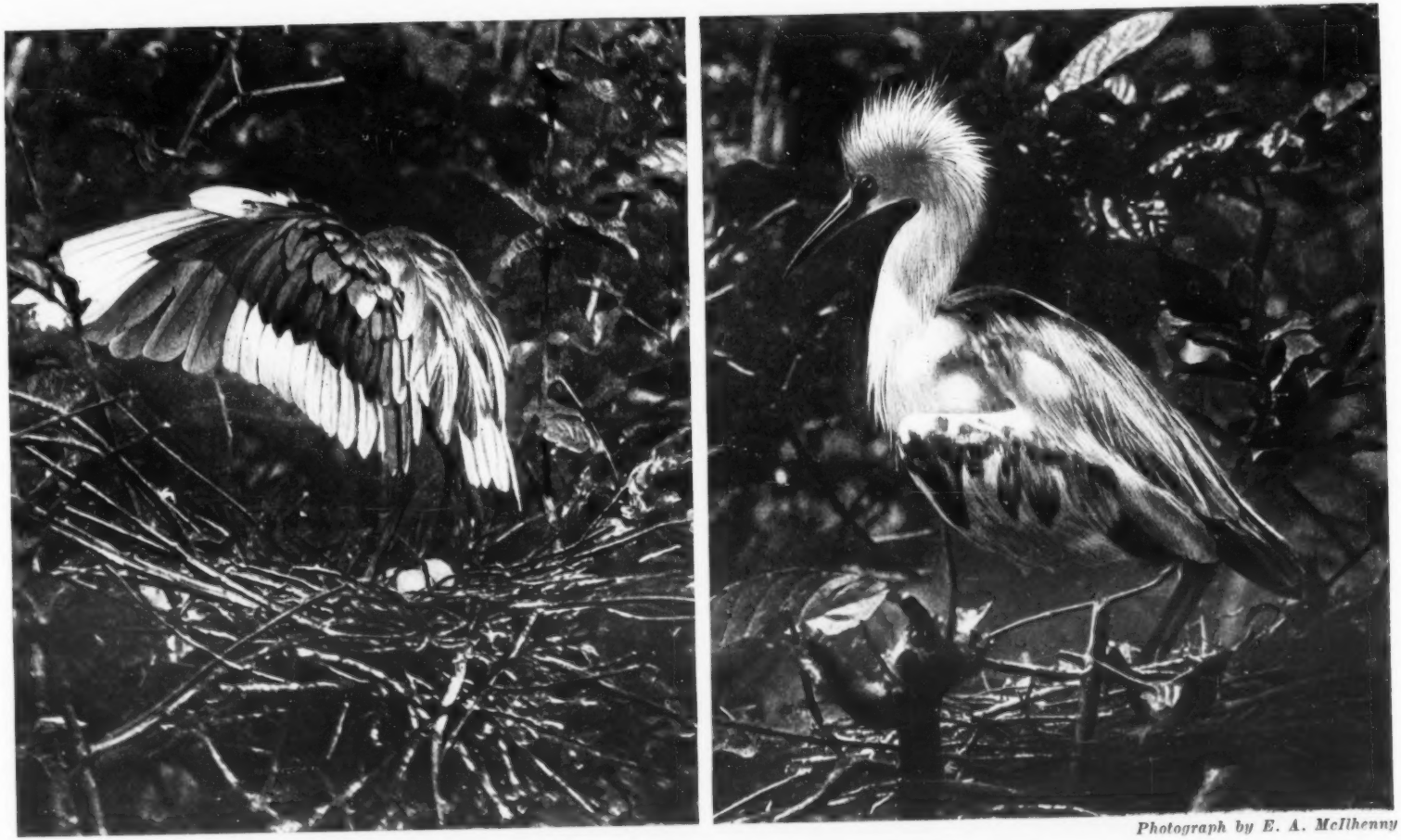
A SPECIES ALMOST EXTERMINATED BY PLUME HUNTERS

The little snowy heron, or egret, is now carefully protected by the United States Government. Its home life has been studied in detail by Mr. McIlhenny at Avery Island Heronry. The male gathers the materials for the nest and the female builds them into the frail platform, but both birds take their turn incubating the four greenish eggs. After about eighteen days the young birds hatch from the eggs, skinny little fellows with lines of white down. They are very unattractive looking for three weeks, but then begin to grow rapidly and are soon climbing about the limbs of the tree, using their wings, beak, and feet to aid them. As the young grow, their appetites increase until each old bird must make six or eight trips a day to the fishpond of the heronry

Photograph by E. A. McIlhenny

SNOWY HERONS DISPLAYING THE NUPTIAL PLUMES, OR "AIGRETTES"

One bird watches continually at the nest and when its mate returns with crop full of fish for the young birds, the two caress and coo with a great show of affection, throwing out their plumes like puffs of powder and erecting their crests and neck feathers. The snowy egrets are birds of grace, their white plumage, gold-lustered eyes, and glossy black legs making a brilliant contrast with the gray monotony of the swamps in which they usually make their home. The long, delicate "aigrette" plumes were once much in demand for millinery ornaments and the bird paid the inevitable price of beauty in wild things, being hunted nearly to extinction



Photograph by E. A. McIlhenny

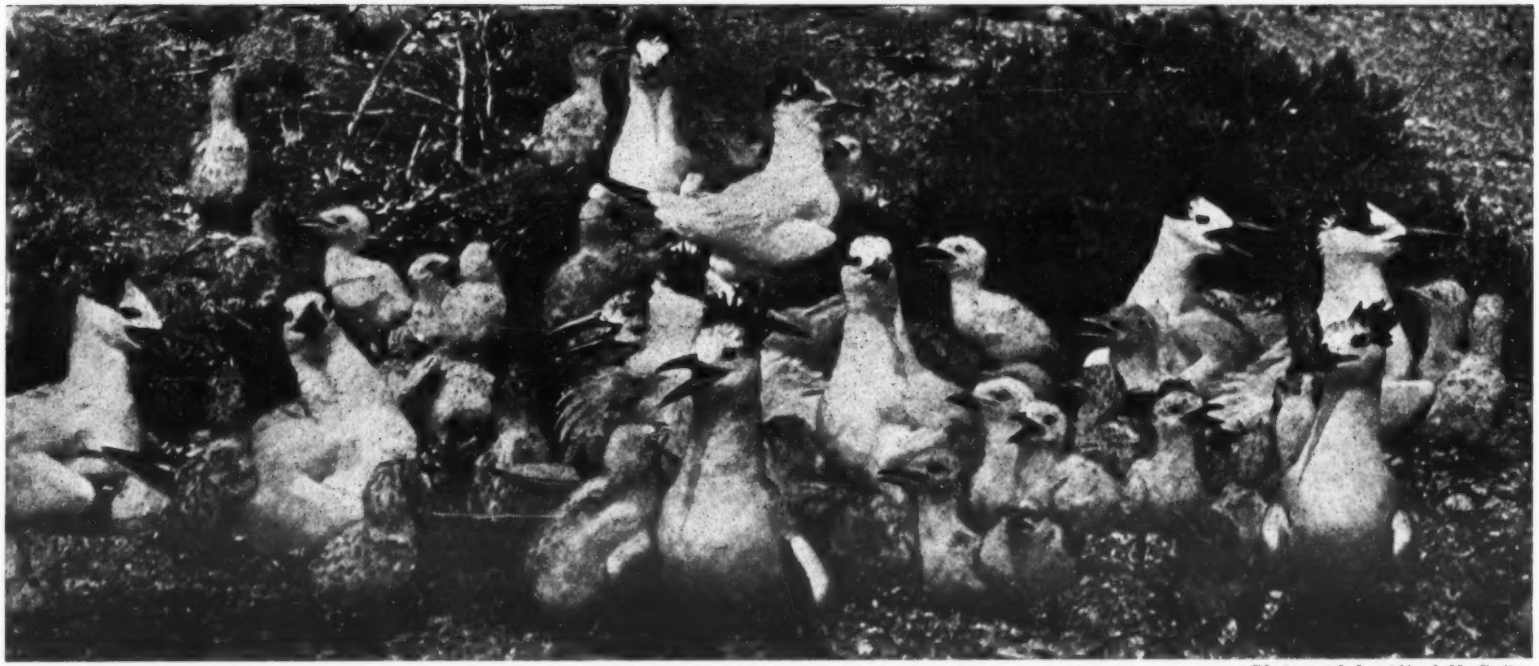
"CALICO BIRDS," LITTLE BLUE HERONS IN IMMATURE PLUMAGE

The little blue herons breed in the immature, or "calico bird," plumage (see adult plumage on page 55). The bird on the left with spread wings displays to good advantage the clouded primaries and a set of blue feathers portentous of the coming coloration. These herons build their nests among the water willows, and lay four or five eggs very similar to those of the snowy egret. Mr. McIlhenny, taking advantage of this similarity in the eggs, increased the number of snowy egrets in his Avery Island Heronry by replacing the blue herons' eggs with the egrets'

Photograph by Alfred M. Bailey

LOUISIANA PROTECTS HER THOUSANDS OF ROYAL TERNS

The royal terns nest by the thousands on all the outlying islands. They stand astraddle the single egg or young, with uplifted crest and wings half drooping, calling with evident pride as loudly and as harshly as they can. Then they gently lower their bodies toward the ground, the breast feathers parting to allow the egg or young bird to be snuggled against the skin. Although the terns are rather quarrelsome and have their family disputes, the home life is carried on in immense colonies and many thousands of young are raised each year



Photograph by Alfred M. Bailey

A SIGHT THAT DELIGHTS THE HEART OF THE BIRD LOVER

Young royal terns, when disturbed by an intruding visitor, take to the water, and it is no uncommon thing to see whole "rafts" of these little birds swimming along parallel to their home island, or even far out at sea. The old birds guide their young back to shore after they feel that all danger from intrusion is past. They hover overhead and seem to be scolding, then fly back toward the land, but immediately circle round again as though to push the youngsters along

Photograph by Alfred M. Bailey

THE FEARLESS ROYAL TERNS

The royal terns are well named, for they have a truly royal bearing with large, strong wings, dark, keen eyes and heavy, capable bill. They nest farther from the edge of the gulf than do the Cabots, but their eggs and young are so similar to those of the latter that they are nearly indistinguishable. Both royals and Cabots nest so close together that there is barely space for the birds to cover their eggs, and yet no bird seems to have the least doubt as to which egg is its own. The terns are quite tame, now that feather hunting is no more, so that a bird lover may spend hours within a few feet of their haunts without their seeming to resent his intrusion in the least

Photograph by Alfred M. Bailey

A LOUISIANA BIRD HAUNT

In spring the subtropical forests of Louisiana's alluvial plains, the low coast marshes, and the wide prairies with their surmounting pine hills offer a natural paradise in which all the water birds may build their nests and raise their broods. All the feathered folk which use the Mississippi Valley as a migration route, revel in the natural luxuriance of the state and enjoy the enviable protection which is there afforded

Photograph by Alfred M. Bailey

THE BLUE GOOSE FROM ARCTIC TUNDRAS

In winter the ducks and geese arrive from northern lakes and distant Arctic tundras to feed on the wind-swept savannahs and sport along the marshy beaches. The blue geese are peculiarly colored, dark above and below with pure white heads, although occasionally individuals have immaculate underparts, or may show various intergradations between dark and light. The residents of Louisiana say that the geese used to come in such numbers that they covered the coast for miles, a great mass of floating birds, but lack of protection for many years has depleted the numbers

"Four Years in the White North"—A Review

By HERBERT L. BRIDGMAN*

DETERMINATION of the scientific value of the work of the Crocker Land Expedition is for the future, but the *Four Years in the White North*[1] of its leader, Mr. Donald B. MacMillan, may be appraised at once as a human document, one of the most instructive and entertaining contributions to the literature of the North. It should not, however, be inferred that Mr. MacMillan evades or avoids the scientific inquest, which must later be held by specialists and experts on his work. On the contrary, he distinctly invites it by a detailed, itemized list of the expedition's records and achievements in which more than a score of distinct and comparatively independent pieces of work are set forth as if to aid in distributing the credit in a final and authoritative valuation of the whole. It may fairly be doubted whether any expedition which ever sought and wrought in the Arctic zone was more persistently dogged by ill luck than that whose adventures of chance or mischance are recounted in MacMillan's four years' absence; a term it may be well worth while to remark, never exceeded by any expedition in the eastern Arctic and equaled only by Admiral Peary's in 1898–1902, during which he accomplished his great journey around the northern end of Greenland and definitely eliminated that route to the North Pole from the possibilities.

Born in refraction and imagination, shadowed and delayed by George Borup's tragic and untimely death, almost wrecked the second night out of port, navigation entrusted to a hesitant and inexperienced master, a company which made up in enthusiasm what it lacked in training, its principal objective upon which rested name and existence, the very reason for its being, dissolved like the baseless fabric of a dream, with no sight or news of relief ships the first summer and none the second, incompetence of men and perversity of nature both conspiring to prevent the ships from breaking through the pack and reaching destination and effecting a rescue, the party gradually dwindling one by one, each taking chances and making the best of his way homeward, a disclosure of what must have been the low ebb of spirits and mental vitality, until at Christmas, 1916, only two of the original party remained: all these incidents, and others like them which are obvious, and still others which must inevitably have existed, demonstrate a condition of things which, protracted through four long years, must have meant a strain on nerves, temper, and mental and physical force which only the best equipped and most wisely conserved could withstand. That MacMillan endured the test and begged to be allowed to stay another year when Captain Robert A. Bartlett and the "Neptune" finally arrived at Etah and insisted that he return, shows that he is of the stuff of which explorers are made.

It is not perhaps worth while to attempt to re-state the narrative and experiences of the expedition. That has

[1] *Four Years in the White North*, by Donald B. MacMillan. Harper & Brothers, New York, 1918.

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The eggs of the knot (*Tringa canutus*) are very rare in collections, for this sandpiper has not often been found by explorers because it makes its home well back in the hills of Greenland. Greely was the first to describe the egg of this species. The eggs of all wild fowl which nest along the shore are a regular source of food supply to the Eskimos and are preserved for winter use by freezing

already been done by Mr. MacMillan in magazine and other articles, although the *Four Years* does sensible and valuable service in bringing the whole story together from beginning to end. Here anyone by a little study can determine exactly the order, personnel, and time of the several field parties, and just where any member was and what he was doing on a certain date. It is no depreciation, either, of the work to say that the manner rather than the matter of the story will most surely arrest and hold the attention of the readers, a style and quality absolutely unique among books of its class. A certain sort of optimism, not to say exuberance, soon impresses itself on the consciousness of the reader and, as he goes on, he is inclined to wonder whether MacMillan may be, not the original Mark Tapley, in which case he would be rather venerable, but his intensified and more highly developed reincarnation.

When Crocker Land "busted," to quote the street's expressive irreverent word, MacMillan took the whole experience philosophically. When he had retraced his steps to Peary's Cape

The knot on its nest.—In summer the feathers of the back are black, margined with reddish yellow. The rump is white, tinged with red, and the lower parts are deep bay. This coloration renders the sandpiper difficult to discern when on the nest

Thomas Hubbard outlook, and saw what Peary had seen two years before, he sturdily confirmed Peary's opinion and declared that, except for his experience and physical and ocular demonstration, he should say unhesitatingly that he saw distant land. When, two years later, he was at King Christian Island after an arduous and obstinate march, and was obliged to turn back with his reconnaissance incompleted because his dogs were "all in" and his food nearly "all out," he accepted the inevitable with the same good temper and quenchless optimism.

Once a familiar visitor to our Atlantic coast, the knot has gone the way of many edible waterfowl and is now relatively rare. It is a species of very wide distribution, breeding in the Arctic countries from Iceland to Siberia and wintering on all the continents of the world. In olden days the English netted and fattened these birds for the table, and several early writings on their care and culinary uses are still to be found

Apart from the narrative and its running accounts of the expedition, two chords dominate *Four Years* and give it a distinctive place among all books of its class. To these might be added a third, that of literary style, although it so fuses and intermingles itself with the more prominent and essential features that its presence is less readily recognized and appreciated.

First, in his understanding and sympathy with the natives, his faithful comrades and helpers, MacMillan is unique and remarkable. A considerable understanding of the language and a comprehension of customs and of that indefinable something, racial spirit, of the Eskimo, seem to have brought about a condition of confidence and coöperation, which until Peary's time was utterly unknown, and which in MacMillan's case was doubtless the consequence and fruitage of his years of association with that great leader.

MacMillan applied and enlarged the Peary method and the principles of his master, and demonstrated again that the support and loyalty of the Eskimos are indispensable to any explorer working in the eastern Arctic hemisphere. MacMillan, however, seems to have gained the good graces of the whole tribe, old and young, women and children, as well as of the men, the hunters and the sledge drivers of his field parties. It is no slight testimonial to his poise and control that he was able

to hold them all loyal and attached throughout the expedition's long stay in the Arctic. Into all the Eskimos' domestic, even love affairs, the current of daily life and gossip, MacMillan entered with lively sympathy and keen appreciation. This is reflected on almost every page of his book and expressed in numberless instances of service and hospitality.

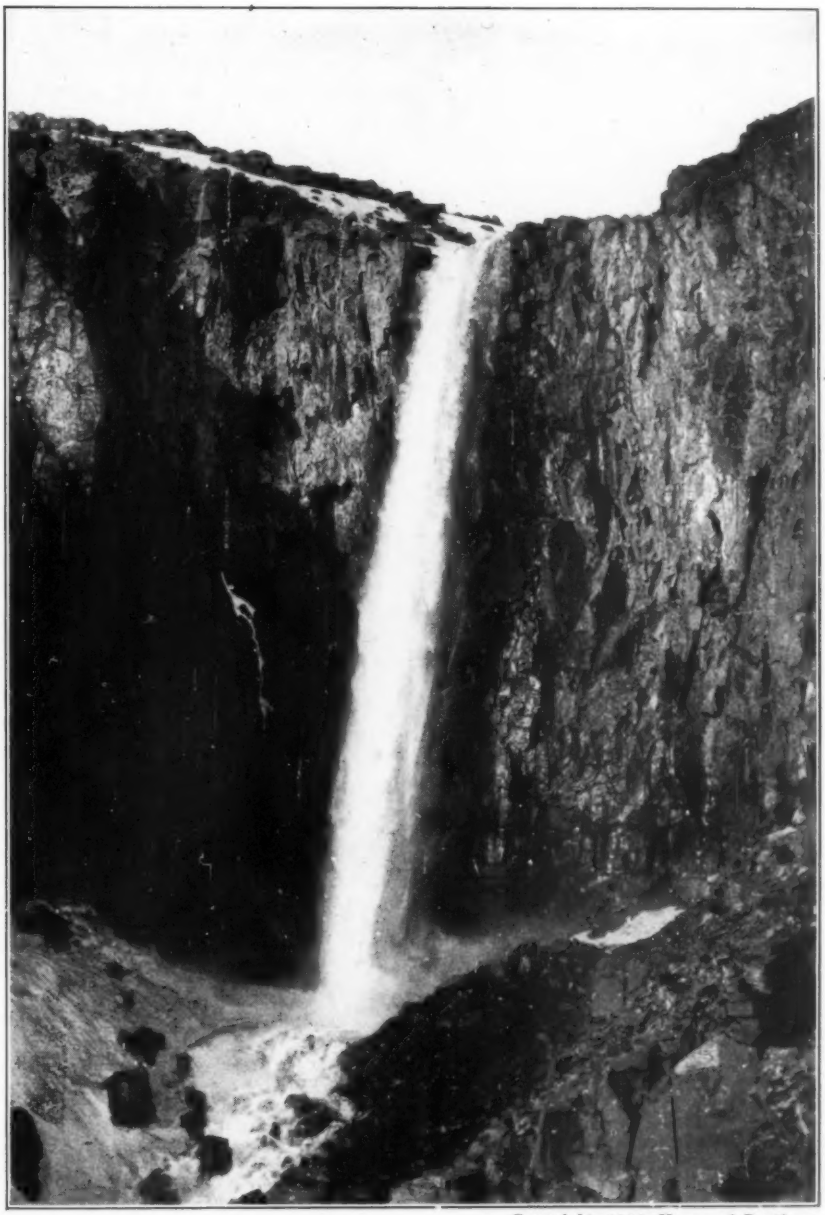
The other characteristic of *Four Years* rests in the fact that no lover of the tropics and their languor and luxury ever lost himself in "wonder, admiration and praise" more genuinely and unreservedly than MacMillan loses himself in his affection for and loyalty to the Arctic, its phenomena and environment. Torngak, the demon, had no terror for him. While of course it is admitted that there have been times and places more agreeable than the weather side of a pressure ridge in the blinding snow at 40° below, or on a toboggan in darkness rushing down a glacier to whatever may be at the bottom, or plunging along the ice foot on a ledge from which the dogs are occasionally pulled up to the trail again by main strength, or snowbound in an igloo, oil gone and food almost exhausted, nevertheless, all these are forgotten when summer and the million birds come, the waters are unloosed, the picturesque falls flow again, and the poppies carpet the scanty fields with their "cloths of gold." The transposition is complete and Mr. MacMillan has succeeded in transferring its spell to the pages of his book.

Less severe and nervous in style than Peary, less stately and scientific than Scott, less verbose and subjective, fortunately, than Nansen, MacMillan writes with a freedom, almost abandon, of appreciation, which strikes a distinctly new note in the annals of the Arctic and which will carry his *Four Years* to many readers for its own intrinsic charm and sympathetic exposition.

Two omissions, one more, the other less, important, may be noted. That no map should have been provided for a work which is so much almost all outdoors is inexplicable, possibly inexcusable. This is the more remarkable, as maps on which all the geographical outlines and the track charts have been located are readily available, and it would seem that the first duty of the publishers should have been to supply an edition which would contain a simple outline map by which the different parties and their relations to one another might be followed and understood. The caricature of a map used, which is notable mainly for misspelled names, in no degree answers the purpose and is not worthy author or publisher.

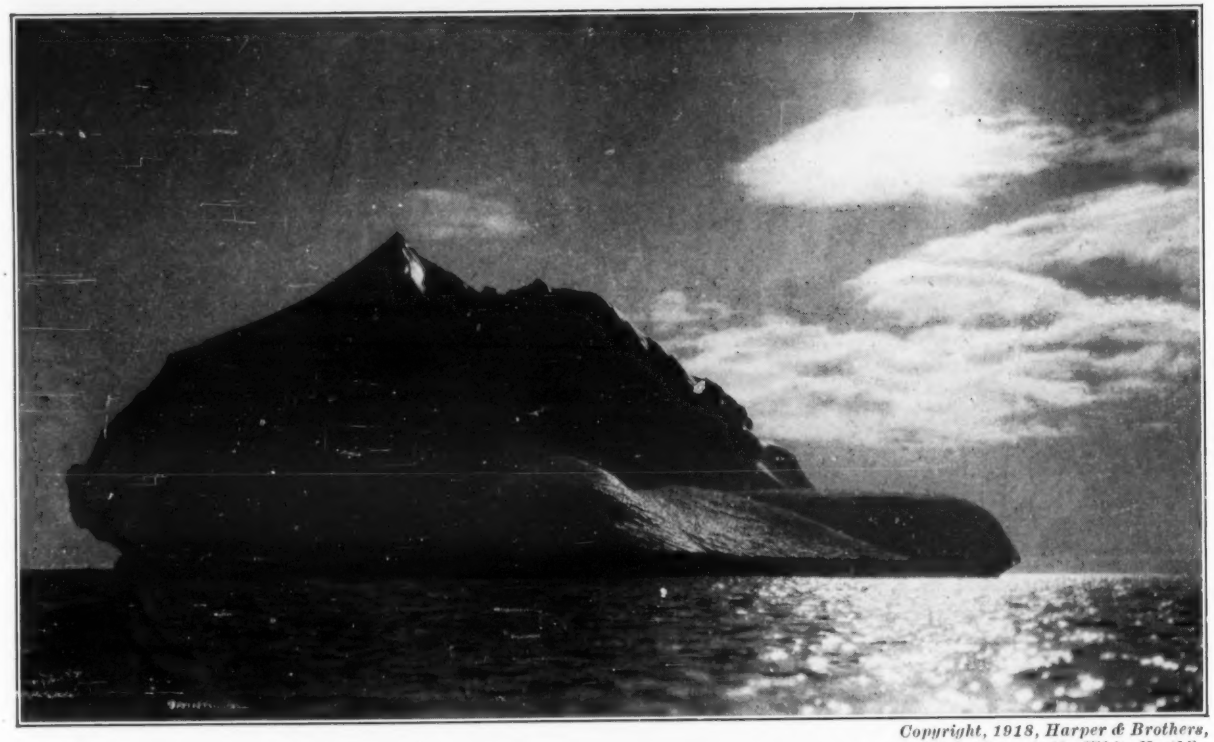
MacMillan wisely ignored the Cook controversy, or what the malicious and misguided tried to make a controversy, of ten years ago; but his faithful and loyal E-took-a-shoo remembers it all, identified the landmarks, the courses, distances, and locations. If MacMillan had chosen to have the testimony of an eyewitness, he could have given the finishing and conclusive blows to a foul thing, which, however, is rapidly receding from deserved contempt into merited oblivion. Sometime, possibly in the interest of the truth and for the help of future historians, MacMillan may give to the world from E-took-a-shoo's lips the true and literal story of that extraordinary episode.

The seven appendixes to *Four Years* are all valuable and contain much supplemental and collateral information by the other members of the expedition. Ekblaw's nearly one hundred pages give the tale of his great traverse of Grant and Ellesmere lands in 1915, with other sledge excursions, and a study of the vegetation about Borup Lodge, the headquarters, while MacMillan contributes a detailed memorandum of the thirty-five species of Arctic birds with which he made personal acquaintance.



SUMMERTIME

When the long summer day begins and the sun comes up from the south, the sea ice breaks and the snows melt. Then on all sides can be heard the sound of running water and the call of the birds. The hills burst into blossom, the Eskimo tribes gather together for a great hunt and holiday, and Nannook, the polar bear, goes fishing for seals



AN ICEBERG TRAVELING SOUTHWARD IN MELVILLE BAY

These great outguards of the Arctic sea are born in the century-old snows of the Greenland ice cap. They crumble from the projecting ends of the numerous glaciers, squeezed out to the sea by the tremendous weight of this eight-thousand-foot ice mass, and float southward in the ocean currents to pile on the Labrador coast or meet their death in the warm waters of the mid-Atlantic.

In Melville Bay the explorer and whaler first begin their battle against sea ice, snow, and wind. If the season is propitious, they may sail to the north of Greenland, but if the elements turn against them here, they will go back defeated or else be crushed in the ice mill of the Labrador current

MACMILLAN'S DOG TEAM WAITING TO BE FED

Eskimo dogs are supposed to be descendants of the northern gray wolf and greatly resemble their ancestor except for their curled tails. Fleet of foot, good-natured, and hard working, they are absolutely essential companions of Arctic travel and hunt. With their backs humped from hunger and their tails drooping from fatigue, they will pull away on starvation rations or on no rations at all until they literally drop from exhaustion. Should they scent game *en route*, the driver's only choice lies between slipping the traces or receiving a wild ride in pursuit. Walrus is their best food and polar bear hunting their greatest sport

A FINE DAY, GOOD GOING, AND A WELL-FED TEAM

On a smooth hard surface a well-fed team gives an exhilarating exhibition of speed. In the eastern Arctic a team usually consists of from eight to twelve dogs harnessed separately by sixteen-foot rawhide traces. This arrangement makes it possible for a driver, seated on the sledge with his twenty-five foot whip, to keep each dog at his task, but it also has the obvious disadvantage of giving the outside dogs only an indirect pull. Also the traces gradually get braided into a huge rope which requires much patience to disentangle at below-zero temperatures. On a smooth surface ten dogs will pull two thousand pounds, but when rough ice or snowdrifts are encountered, the weight of the load depends as much upon the driver's strength as upon the team's pulling power

THE MIDNIGHT SUN OVER CAPE SABINE

Cape Sabine and Etah on either side of Smith Sound are the "Pillars of Hercules" of the North American route to the Pole. Many ships have driven their prows into the ice which binds these two points, only to turn back discouraged. A few have passed on, some to return successfully and some to have the ice lock behind them. This cape has witnessed the ships of three nations vainly endeavoring to reach the Polar Sea. Captain Inglefield, R.N., first sighted the cape in 1852 and "beheld the open sea stretching through seven points of the compass," but so rapidly did this sea close up on him that he was compelled to drive a hasty retreat to the south. Dr. Kane, the first American explorer, was icebound shortly after passing, and it was just off this cape that the "Proteus," searching for Greely, went down in the ice jam. In 1905 Peary's ship "Roosevelt" sailed past on her first voyage, only to creep back the next year into Etah Harbor a battered hulk. But she returned here again in 1908 on her last and successful attempt to reach the Pole. MacMillan, on the Crocker Land Expedition, made his base at Etah and sledged across the Sound to Cape Sabine on Ellesmere Land, from which he made a rapid journey on to the open sea in the direction in which Peary thought he discerned land

Apparently Nannook visited Borup Lodge expressly to be photographed, and very accommodatingly climbed a berg near by for his pose. Cold and ice and freezing salt water have no terrors for the "King of the North," but dogs and Winchesters are easily his masters. It is no great sport hunting the polar bear, but he supplies good meat for winter days and warm fur for winter trousers. Peary introduced the wearing of furs as does the Eskimo in place of woolen clothes, and this innovation has been a life-saver for polar explorers

Traveling on the ice foot, the great natural highway of the North.—This pathway, lying between high and low tide, is formed by the continual accretion of ice left by each receding tide. This fringe extends along the shore line, even where the sea cliffs are vertical, and after the sea ice breaks up it forms the only smooth, although at times precarious, thoroughfare for the Arctic traveler and his dog sledge

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"Four Years in the White North"

The ring of rocks which held down Greely's tent in "Starvation Camp" on Cape Sabine, where the surviving seven of his party of twenty-five were finally rescued by Schley as they were at the verge of death.—Greely had established on Lady Franklin Bay one of the international circumpolar scientific stations planned by the United States Government. MacMillan, working from Cape Sabine, explored considerable stretches of hitherto unvisited shore line and interior on the large islands off the Greenland coast

Copyright, 1918, Harper & Brothers,
"Four Years in the White North"

Peary's old hut at Cape Sabine, built during the unsuccessful North Pole Expedition of 1900–1902, just across Smith Sound from Etah, where Peary and, later, MacMillan wintered. From Etah Peary sledged to Cape Sabine and established headquarters from which he could move north in the spring to Fort Conger, Greely's old headquarters, and then on to the polar ice. This is the so-called "American Route" by which attempts to reach the Pole have been made

IN THE NEW YORK STATE FOREST PRESERVE

The New York State Forest Preserve in the Adirondacks and the Catskills is a glorious garden of nearly 2,000,000 acres in which every resident of New York State is part owner. The state seeks to conserve this great area of field and forest, mountain, lake, and stream to safeguard New York's water supply, present and future, as a permanent protection to the sources of the state's greatest rivers. While doing this it leaves the entire tract open to the people for sport, recreation, study, or camp life—a playground for 10,000,000 people, and room for them all! The state asks only their appreciation of what conservation of the forests means, and that it can be done only through the coöperation of all the people. It has taken nature many lifetimes to grow the forests and set the watercourses, and only the same slow process can restore them if they are destroyed

Forest Conservation in New York

THE FOREST PRESERVE IS OWNED COLLECTIVELY BY ALL THE PEOPLE OF THE STATE

By GEORGE D. PRATT

New York State Conservation Commissioner

NEW York State's Forest Preserve was created in 1885.[1] Since that date the state-owned land in the Adirondack and Catskill mountains has been increased, until the preserve now includes a total of 1,838,322 acres, an area greater than the small states of Rhode Island and Delaware combined. Its administration is in the hands of the Conservation Commission—a big task when we consider that the state-owned land is bounded by more than 9000 miles of property lines. It involves many intricate questions of litigation, sociology, recreation, fire protection, and reforestation.

Much of the land comprising the Forest Preserve unfortunately consists of comparatively small parcels, intermixed with privately owned land; in fact only about 50 per cent of the vital forest land is owned by the state and the remaining 50 per cent is subject to the most uncontrolled exploitation. In order to consolidate the state holdings, the voters of New York State, in 1916, approved by a large majority a bond issue of $7,500,000 for the purchase by the state of lands in the Adirondack and Catskill regions to be added to that already owned by the state, and, according to the state constitution, "to be forever kept as wild forest lands."[2]

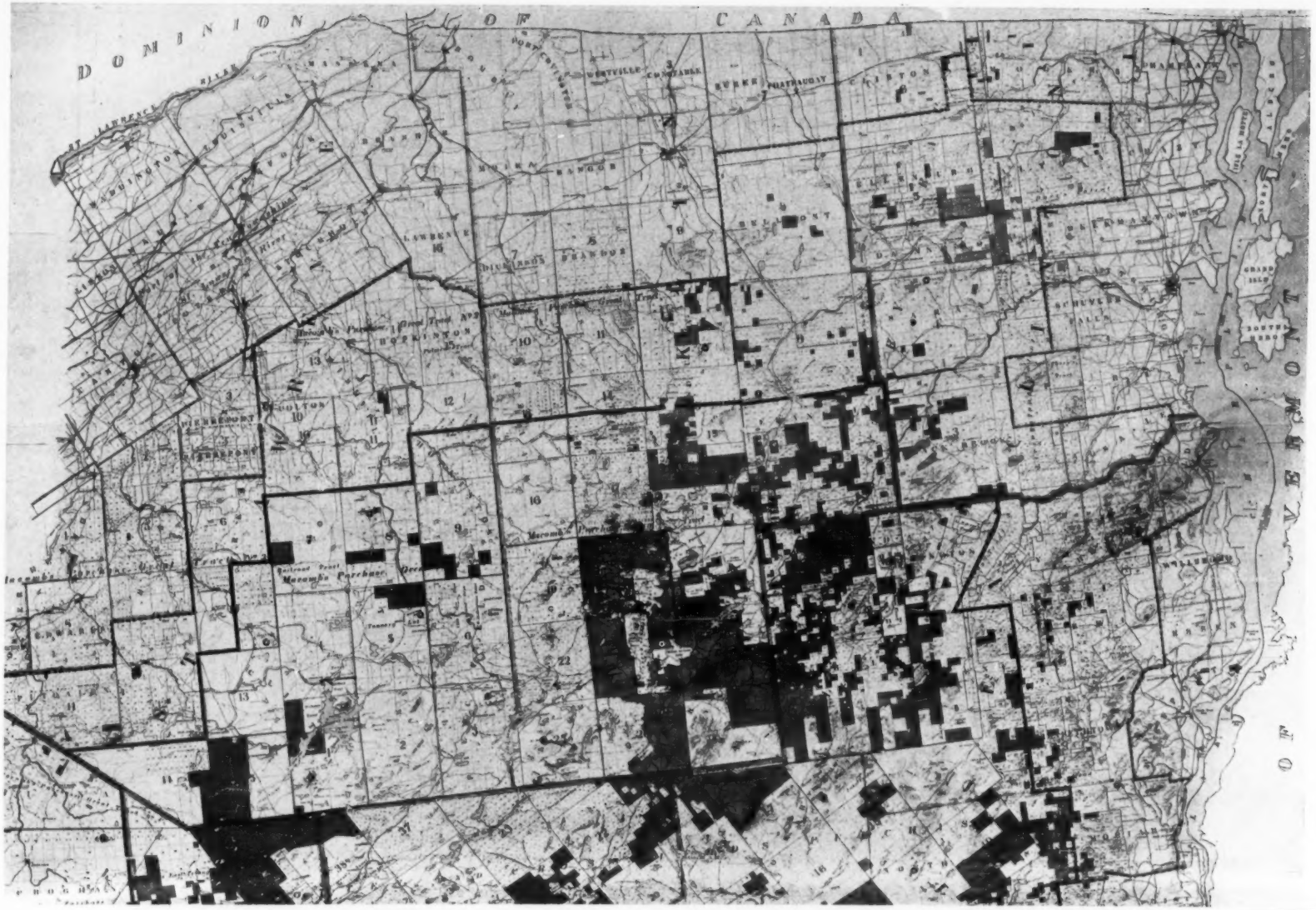
One of the greatest problems, therefore, now before the New York Conservation Commission is the wisest and most effective expenditure of the money authorized by this bond issue for additions to the Forest Preserve. Lands must be purchased for the state which will be most useful for Forest Preserve purposes and which will round out the state's holdings in its mountainous and natural forest regions.

The problem is not so simple a one of buying and selling as might at first

[1] As long ago as 1822, De Witt Clinton, then governor of New York, told the legislature that "Our forests are falling rapidly before the progress of settlement, and a scarcity of wood for fuel, ship and house building, and other useful purposes, is already felt in the increasing prices for that indispensable article. No system for plantation for the production of trees, and no system of economy for their preservation, has been adopted, and probably none will be until severe privations are experienced." We have no record that any definite action followed this good advice, doubtless because the severe privations foreseen by De Witt Clinton were slow in arriving. It was not until 1885 that his wise suggestions regarding forest conservation began to be followed.

[2] The value of the Forest Preserve as a safeguard for New York's present and future water supply, and as a protection to the sources of New York's greatest rivers, is practically self-evident. But there are further economic advantages of great forested areas which are not generally appreciated. They are not only conservers of water supply, but they are actual regulators of climate and inducers of rain. Regions of extensive tree growth are cooler in summer and warmer in winter, with smaller sudden fluctuations in temperature, than barren sections of similar location. Moisture-laden winds from the ocean or from large inland bodies of water sweep onward over the land until they strike the cooler currents of wooded areas. This moisture is then precipitated as rain, which falls over wide areas of forest and farm land. In this respect New York is most fortunately situated, drawing rain from both the Atlantic Ocean and the Great Lakes.

In conserving the rain that has fallen, the forests render a still further service. The ground under the trees is covered with the accumulated débris of years or even of centuries. This is the duff, the carpet of the forest floor. It serves two purposes, namely, preventing rapid evaporation of ground water when dry winds sweep over the land, and acting as a sponge to hold the rainfall and control the run-off. In the arid regions of the west the rain runs down the creek beds like water from a shingled roof, and soon after the rain has ceased the ground is as dry as before. The forests thus equalize the flow of the streams and regulate the power they generate for industrial purposes, by reducing floods in the spring or after heavy rains, and providing a steadier flow in the summer. The deep snow of winter melts more slowly under the trees, and the run-off is more gradual.


DOMINION OF CANADA
VERMONT

ADIRONDACK FOREST AND ADJOINING TERRITORY

Compiled in 1917 from maps and field notes on file in the State Department at Albany, New York, and from the topographic sheets of the United States Geological Survey. The New York State Forest Preserve now includes a total of 1,838,322 acres, an area greater than the small states of Rhode Island and Delaware combined. Much of the land comprising the Forest Preserve unfortunately consists of comparatively small parcels, intermixed with privately owned land; in fact only about 50 per cent of the vital forest land in the Adirondacks, as shown by the dark areas on the map, is state owned and the other 50 per cent is still subject to possible uncontrolled commercial exploitation

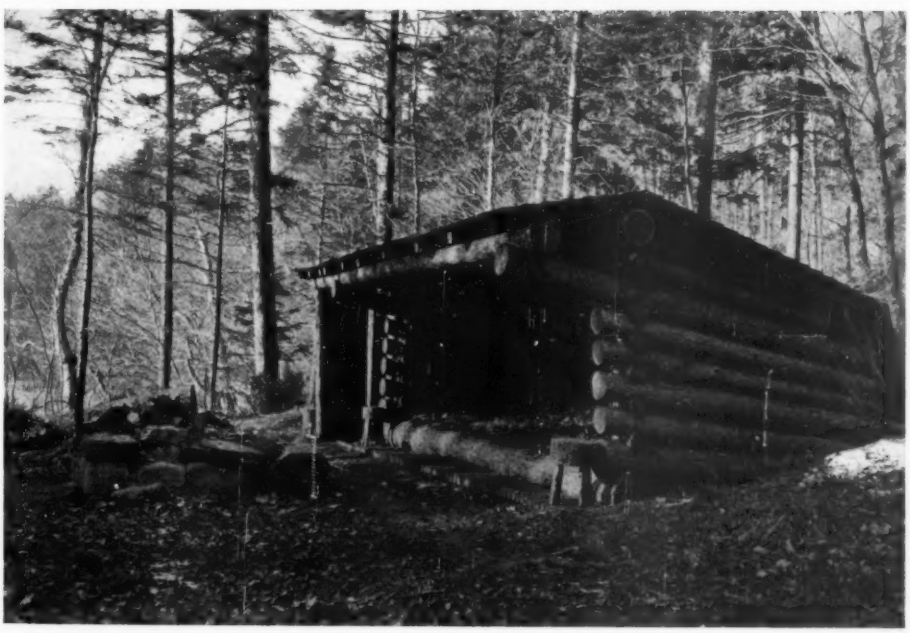
be imagined. In the preservation of stream flow, the forests upon the steep mountainsides are of first importance. If these slopes have been denuded by the ax, and afterward, perhaps, also swept by fire, erosion from rainfall will carry away the soil, and it will be forever impossible to renew a forest growth. The Commission must accordingly determine the sections that are of this character, upon which no further lumbering of any sort should be done, and which should be immediately purchased by the state.

Sections of other lower lands not subject to erosion may have some of the timber removed without detriment to the forest cover. Where this can be allowed, the land can be acquired by the state at a far lower sum than the thickly timbered mountain slopes. These are but two of the considerations that we must have in mind in purchasing additional state land. There are many others, but they are all corollaries of the one great problem of completing the state's Forest Preserve before it is forever too late.

A "corduroy" road built by a lumber company for hauling logs from the mountain slopes. Many of the high slopes have been denuded by the ax and eroded by rainfall so that forest growth can never be renewed on them

Protection of the forests from fires, which, in a large number of cases, start in the "slash" left by lumbermen on privately owned land, is one of the most important tasks of the Conservation Commission. The detailed care of the forests is in the hands of the forest rangers, numbering sixty-five. They report to the five district rangers, who in turn are in immediate touch with the main office in Albany. In addition there are fifty-two fire observers on duty during the dry season.

In the fighting of forest fires, New York has many advantages over some of the other states, because of the mountainous nature of the country which permits the maintenance of mountain observation stations for the quick detection of conflagrations. In New York there are now fifty-two such mountain stations, all of which are connected by telephone with the nearest ranger. On



Semi-permanent camps are welcomed on state land.—Each year more people take advantage of the State Forest Preserve to enjoy the phase of outdoor life they like best. The woods have a full and hearty answer for every appeal, and offer unstinted hospitality for sport or the simple pleasure of life in the open. The upper picture shows one of the most popular camps, a tent with raised floor of wood, set in a dense growth of conifers and deciduous trees. In the lower picture is an open cabin of logs with ample fireplace of rocks. It is set in the sunshine of a clearing

New York State nursery at Salamanca, one of six nurseries owned by the state, where approximately 10,000,000 seedling trees are propagated annually to replant denuded areas. Slat screens protect the tender young trees from direct sun in summer, and are removed in early fall to harden the growth for winter. After permanent snow comes, a single layer of burlap protects the young trees from the danger of alternate freezing and thawing

Ten-year-old transplanted trees in state plantation near Ray Brook.—With young trees from the state nurseries about 4000 acres are planted each year by the state, and as many more by private enterprise. The trees are planted close together to encourage "natural pruning" through lack of direct sunlight on the side branches, thus stimulating the formation of long straight saw logs free from knots

EXAMPLE OF REFORESTATION BY PRIVATE ENTERPRISE

Twenty-eight years ago this land (near Chestertown), denuded and practically worthless, was planted with white pine which today is very valuable and constantly becoming more so. White pine attains its maximum commercial value in about fifty years

Branch of young white pine, dying from white pine blister rust, a parasitic fungus which came from the forest nurseries of Germany in 1909, and has wrought great damage ever since. The whole tree is doomed

many of the mountains wooden towers were at first erected to lift the observers above near obstructions, but during the last two or three years most of these have been replaced with steel towers of permanent construction. The steel towers have a room at the top about seven feet square, with glass windows. The windows protect the observer from the sweep of the wind and make possible his presence on the tower every day and all day long, throughout the critical periods. In these steel towers telephones are installed in the rooms at the top. Cabins for the residence of the observers are provided near the towers.

In working out the system, we have kept in mind the fact that eternal vigilance and quick action, with coordination of all fire-fighting forces, is the key to the safety of our forests. While we have been particularly fortunate in the last few years in weather conditions, we have, nevertheless, had numerous outbreaks of fire, and have been able to prove that they can be promptly detected and the fire-fighting forces quickly put into action.

As a further step toward more complete efficiency, the Conservation Commission has recently prepared, after careful examination of all of the forest land by the ranger force, a fire map upon which is indicated the character of every acre of land in the forest sections—green timber, land lumbered for soft wood, or for both hard and soft wood, with the year when lumbered, burned-over land, barren land, or agricultural land. The map also indicates roads passable for automobiles, or for wagons only, and also foot trails. Upon

The yellow spring spores of the white pine blister rust are ready to start on the wind to their next nursery on the under side of currant and gooseberry leaves, where they will develop until they again go forth on the wind to continue their infection of the pines. Drastic measures are being taken to save the pines. Fortunately the State Conservation Commission can accomplish what would be impossible for private enterprise

On guard over part of the state's great forest preserve which stretches out far and wide beneath him.—This Conservation fire observer on Black Mountain is one of the keen-sighted, cool-headed, alert men trained to distinguish the almost imperceptible difference between wisps of cloud and wisps of smoke floating over the tree tops—a momentous distinction, as failure to report a fire promptly often allows it to get beyond control, and a mistake sends men and equipment many long miles for nothing

it is also indicated every telephone line —and even the telephone instruments. Camps are shown, with the number of men available at each, as well as points where supplies and tools are located. In brief, the fire map is a veritable "war map," and serves as a basis for discussions at meetings of the rangers, private landowners, and officers of the Commission, where all concerned become familiar with the fire problems of the forest districts before the fires have developed. This system of analysis and preparedness is the system that is followed in every well-organized city fire department, and it is the system that we believe necessary if our forests are to be protected in the most critical times.

Three years ago the district rangers were equipped with Ford automobiles for getting easily about their territory and for taking men quickly to fires. Last year we added trailers loaded with camp outfits and tools, so that no time need be lost in getting these necessary articles to the nearest points on a highway.

I have referred to the denudation which follows from unrestricted lumbering and forest fires. In the Forest Preserve alone we have today approximately 125,000 acres of such denuded land which must be replanted with forest trees if a suitable forest growth is to be brought back upon it. Besides this there are vast stretches of privately owned land in the same condition and demanding the same sort of treatment, if we are to pass on to our descendants the forest resources that we ourselves found when we first came into this region. There are also great quantities of idle, non-agricultural land scattered throughout the state that should be brought under forest growth by reforestation.

It may be surprising to many to learn that of the entire extent of the Empire State approximately 35 per cent is suitable for forest growth but not for agriculture. One of the great problems of the Conservation

Fire observation tower on Black Mountain.—Mountain climbing is becoming a favorite sport in America. More than 50,000 persons climbed peaks in the Adirondacks last summer for the view to be obtained from the top

Commission is to bring about the planting of forests not only upon the state's own denuded land, and upon privately owned denuded land in the forest regions, but also upon the hundreds of thousands of acres of idle land in agricultural parts of the state that are fit for nothing but to grow trees. A great beginning has been made in this work by the establishment of six state nurseries which produce each year approximately 10,000,000 young trees. This is only a beginning, however, and tremendous strides must yet be taken before we can feel that we have even begun to approach our goal.

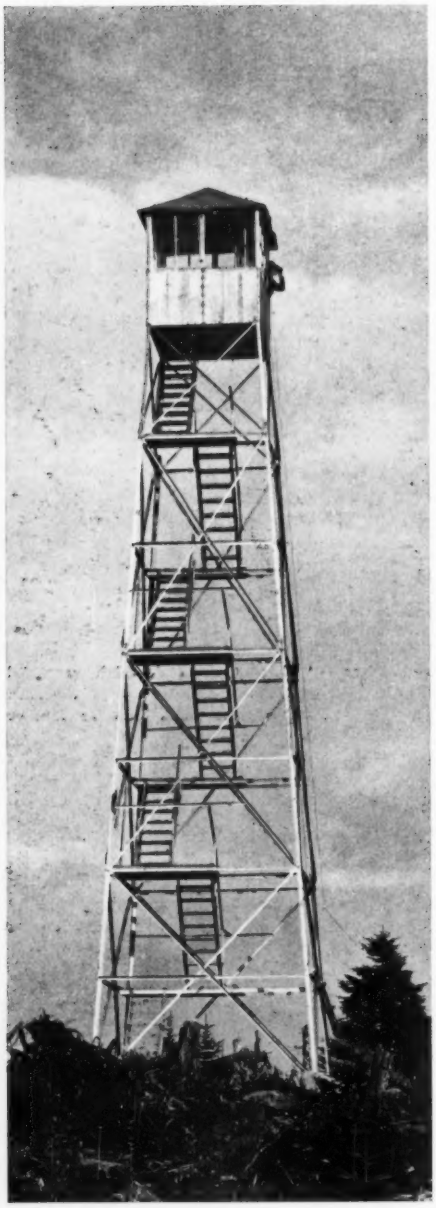
How important this matter of reforestation may become is better understood when we consider that in the warring countries of Europe whole forests have been cut down to supply timber for the uses of war, and that virtually all of these forests had been artificially created by planting. Without these forests the armies of Europe would have been in desperate plight indeed. If this is true in war, how much more true is it in peace, which has so many and varied uses for adequate supplies of timber and wood.

Still another forest conservation problem of tremendous urgency is now before the Commission. There has been an invasion from Germany in the guise of the white pine blister rust. This is a fungus disease which attacks white pine trees and accomplishes their complete destruction. It was imported from some of the forest nurseries of Germany and has already gained a most alarming foothold in many of the eastern states and even in some of those in the Middle West. It is found everywhere throughout New England to an extent that threatens the absolute extermination of white pine trees in those states. Already it has spread across the border into New York and our utmost efforts must be put forth if it is to be checked.

This parasitic fungus has a life history described by the expression "alternating generations." The spores are ripe in May and June and are carried by the wind from the pine trees to the leaves of currant and gooseberry bushes, where they undergo a change and are again carried by the wind either to other currant or gooseberry bushes or back to the white pine. The method of eradication is accordingly to destroy all currant and gooseberry bushes in the immediate neighborhood of infected areas, as well as to destroy the infected trees themselves. The cure must be rigorously applied. It will cost a large amount of money and must be carried out with the utmost degree of thoroughness—otherwise within a compara-

Where man has made both science and nature helpless.—A hillside first denuded by wasteful lumbering and then swept by fire in the slash. This was ten years ago. Rain completed the ruin by washing away the unprotected soil, leaving only bare rocks. The place must now be forever barren, but could have been saved by modern forestry and fire protection

Seconds count in reaching a forest fire.—Three years ago light speedy motors were provided for the district rangers to replace their horses in patrolling the districts and responding to emergency calls. Trailers are attached, carrying additional men and equipment. There are five district rangers who keep in touch with the main office in Albany and direct the detail and routine work of sixty-five forest rangers and fifty-two special fire observers

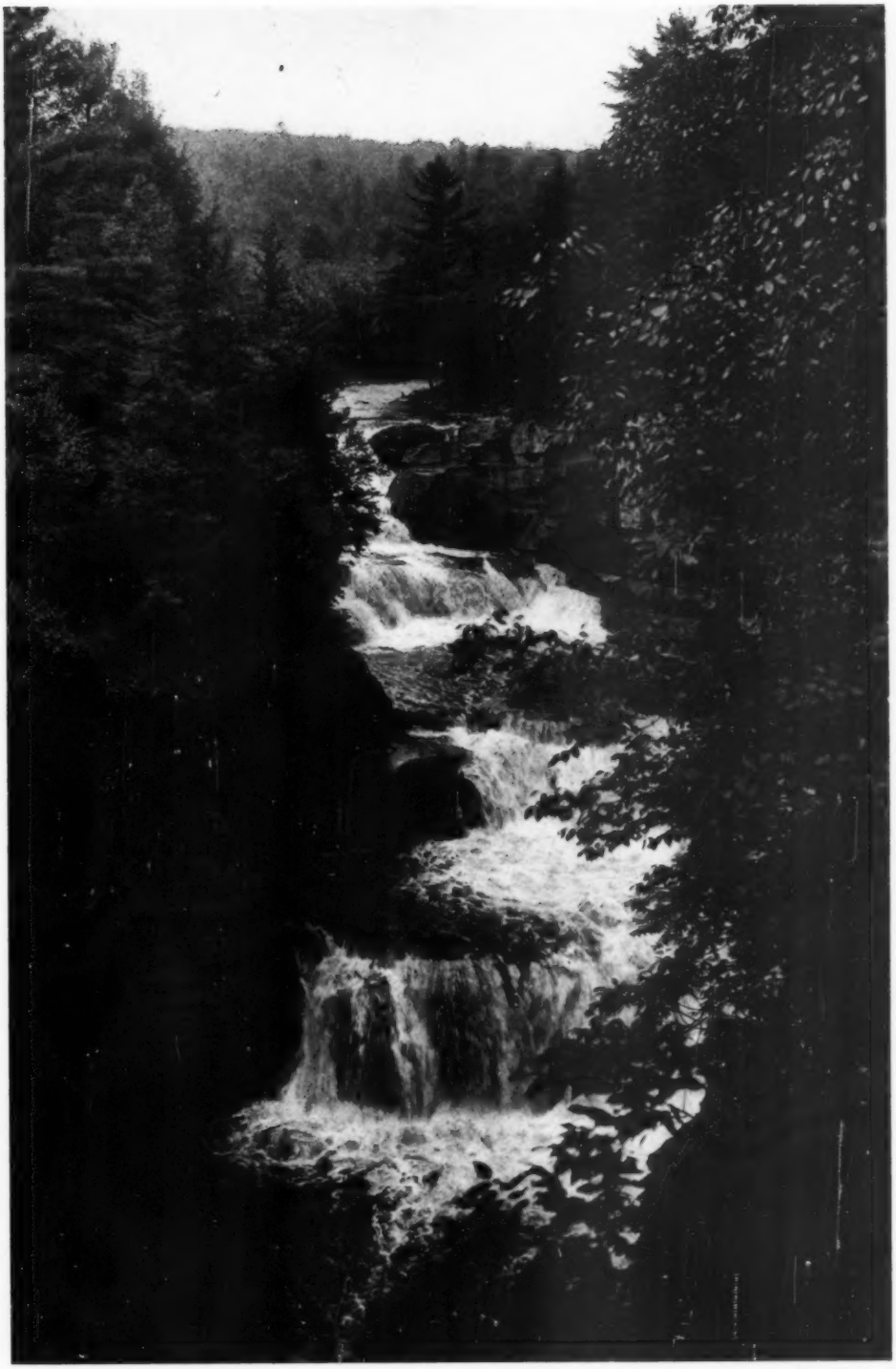


The New York Conservation Commission's new steel fire observation tower on Mount Adams, replacing an old wooden structure. The construction is strong but open, offering little resistance to the wind and quickly shedding the snow. There is a room on top about seven feet square with glass windows to keep out rain and wind, which is very high at this altitude, and a telephone for prompt reporting of fires. The observer has a comfortable cabin close by, but during the danger season he spends all the daylight hours in the tower room

tively short time we shall have no white pine forests in the state of New York.

The Conservation Commission's campaign against the blister rust, and against carelessness with fire in the woods, has been greatly aided by a system of educational work with the public, by means of posters of various sorts and lectures illustrated with lantern slides and motion pictures.

Finally, one of the greatest benefits of forest conservation in New York State and one of the chief interests of the Conservation Commission is the value of the forests for recreation and for æsthetic purposes. It must not be forgotten that *the Forest Preserve is owned collectively by approximately 10,000,000 people,* and that increasing thousands of them are actually making annual use of it for vacation purposes. The sportsman seeks the forests for the fish and game which alone can be found there. But the people who travel to the mountains today for purposes other than fishing and hunting far exceed in number those who rank as sportsmen. It is estimated that fully 50,000 persons climbed the mountains in the Adirondacks last summer, for the views to be obtained from the tops. More than 1300 climbed one mountain alone, and that not one of the most popular ones. Tramping, camping, and canoeing are becoming increasingly favorite forms of recreation, and are annually bringing to the woods more and more vacationists. Many of these people who come to enjoy the Forest Preserve find their shelter in hotels and boarding houses outside its limits. For others the Conservation Commission has formulated the most liberal plan possible under the constitution of the state of New York for the erection of tents and lean-tos for temporary occupancy on state land. It is upon the continued interest and coöperation of this large body of vacationists and the public generally, that the success of New York's broad forest policy depends.



A STREAM THAT COMES FROM FOREST-COVERED HILLS

Such country as this is not valuable for agriculture but it is very valuable for timber growing. Thirty-five per cent of New York State is not suitable for agriculture, but modern methods of forestry can make it profitable for forest growth

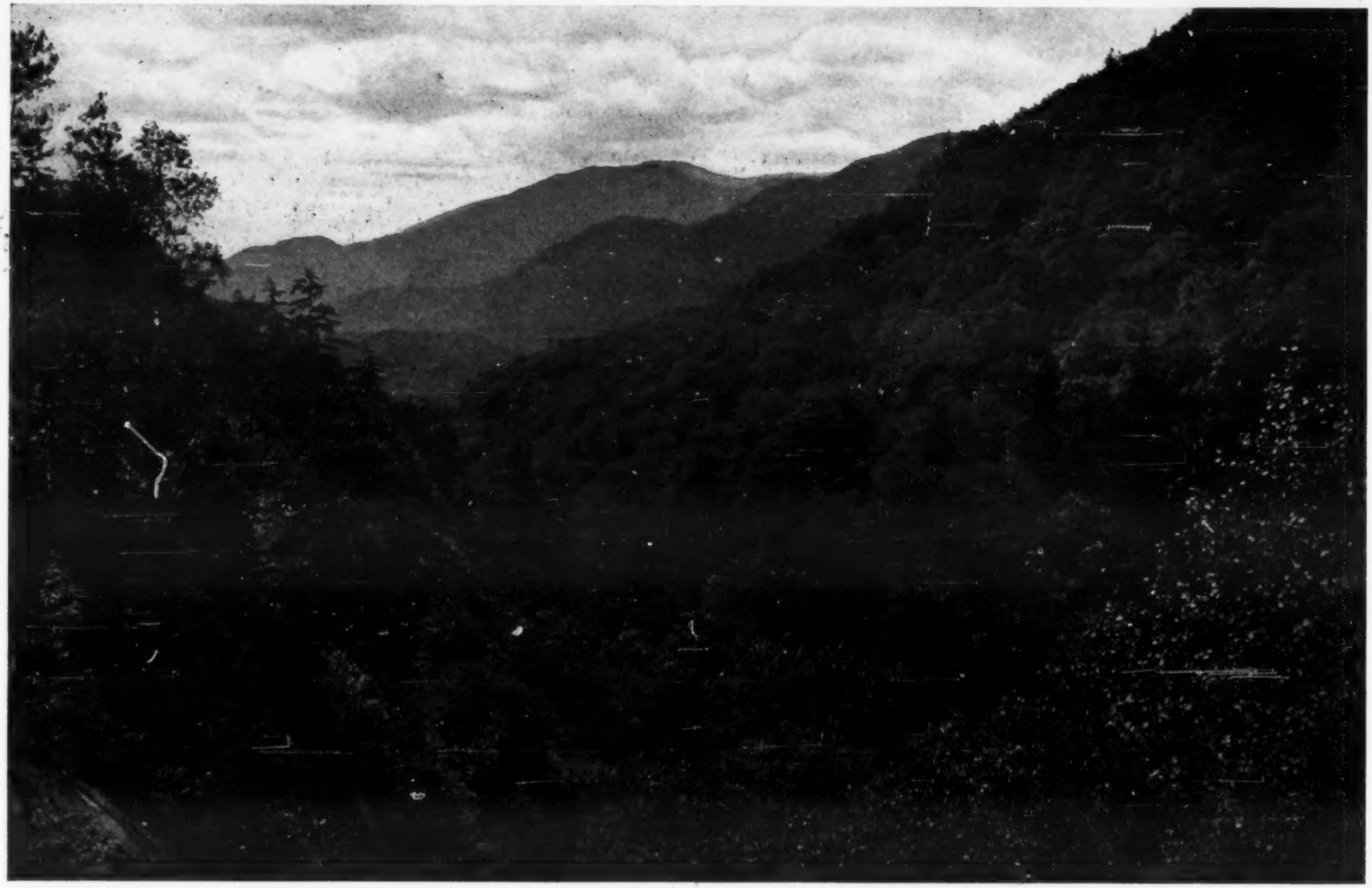
A DEVASTATED EUROPEAN FOREST IN THE WAR ZONE

An American forest swept by fire presents the same scene of desolation as the shell-wrecked forests of Europe. A century will hardly suffice to restore the ruined forests of Europe; and a century will hardly suffice to restore fire-swept forests in America. This is something for every American to think of so that he may use his influence against carelessness with fire on every occasion

BACK ROAD THROUGH THE NEW YORK FOREST PRESERVE

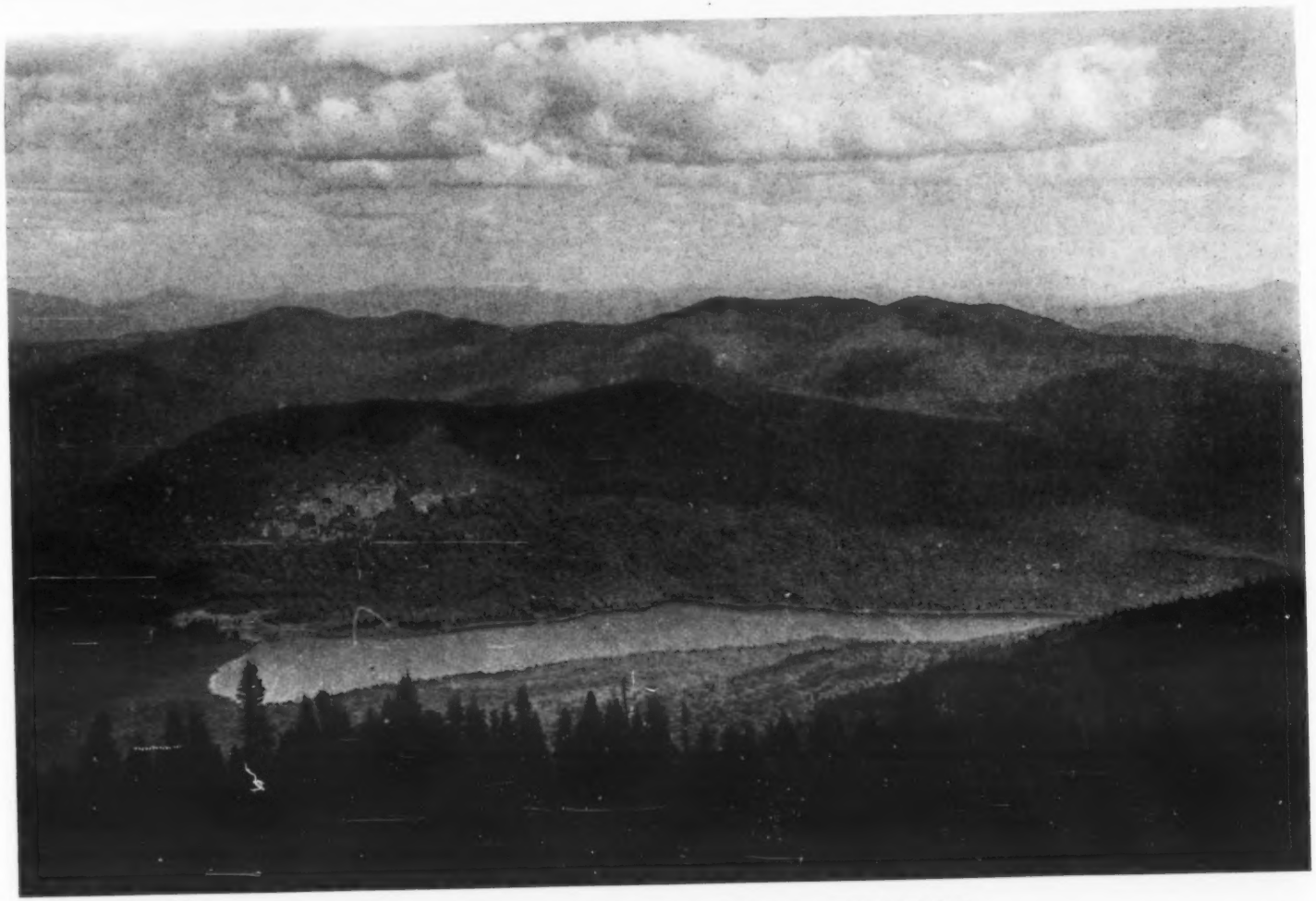
Young deciduous trees have a peculiar charm; delicate as lace work, the soft green layers of their branches stretch against the shadows behind them and gradually fade back into the fascinating mystery of the woods. It is good to feel that such beauty is in the world.

The great enemy of the forest is fire, sometimes smoldering unsuspected so deep under the surface of the humus that when a chance puff of wind breaks it into flame it is only extinguished after great labor by trenching. sometimes roaring through the tree tops with incredible velocity; in any case the factor of importance is promptitude. In the operations of the Conservation fire fighters, the old back roads through the woods prove most useful, making distant points quickly accessible. A fire map is issued, showing every road, trail, station, camp, cache for emergency tools and equipment, the condition, area, and date of burned regions, and character and position of all woods and water courses



FOREST CLAD HEIGHTS OF THE ADIRONDACKS FROM INDIAN PASS

The dense growth that covers these mountains is composed of both conifers and deciduous trees. Permanent preservation of the forests upon the upper elevations is essential for the protection of steep slopes and to prevent great fire risks. The Conservation Commission is now engaged in acquiring such lands for the state, in order to insure a continuous forest growth upon them. New York is fortunate in the position of her forests, for winds may blow east from the ocean or west from the Great Lakes, and their moisture is precipitated in rain by the cool air rising from the forest, and falls over a wide expanse of farm land



THE FORESTS ABOUT TYRELL LAKE IN THE ADIRONDACKS

On the green of the crowded tree tops sunshine alternates with cloud shadow. The spirit of primeval life adds a subtle charm to the beauty of the little lake set in hills that sweep away in almost appalling vastness until they fade away into the horizon.

In the forest shade countless streams have set their courses to feed natural reservoirs and provide water power, navigable rivers, and a supply of water for man and his agricultural lands. Wasteful lumbering, and especially an unguarded fire, would turn all this wealth and beauty into a profitless waste. The forests are the people's birthright, and the state seeks to conserve this birthright for them

BLUE MOUNTAIN LAKE, ONE OF THE MOST BEAUTIFUL IN THE ADIRONDACKS

An island-dotted gem of clearest water, set in a hollow of forested hills. In such a spot the spirit of many a city-crushed toiler is revived and invigorated for months to come. The massive peak of Blue Mountain, from the side of which this photograph was taken, commands the lake

MT. McINTYRE'S SNOW-CLAD PEAK ABOVE SPRUCE FORESTS

High Adirondack slopes are often covered with valuable areas of spruce which the state seeks to preserve. On the ground, the snow protects sleeping mosses, ferns, and flowering plants from rapid changes of temperature, and its moisture slowly disintegrates the fallen dead leaves so that the chemical substances which they contain are absorbed back again into the earth, there nourishing new plant life in the endless cycle of growth

Wild Horses of the Plains

By JAMES H. COOK[1]

INTRODUCTORY NOTE.—Mr. James H. Cook was famous in his youth as an Indian scout and is now recording some of his early experiences on the frontier, of which this article is an excerpt. The American Museum and in fact American science are indebted to him and to his son Harold for the discovery of the Agate Spring Quarry, near the Cook Ranch, on the Niobrara River of western Nebraska, which has proved to be the most wonderful deposit of fossil mammals in the world, with the single exception of the Rancho-la-Brea. At Agate Spring Quarry were found the *Moropus* skeletons described in the February number of the JOURNAL (1918).

The following pen picture of the mustangs is the most perfect I have seen. The superb qualities of these animals were derived from their barb and from their much more remote Arab ancestors. The real mustang is now very rare. Mr. Cook has secured a very typical example for the American Museum's collection of horses.—HENRY FAIRFIELD OSBORN

So far as we have any knowledge, no evidence has as yet been obtained which would prove that horses were living on the North American continent at the time of its discovery by Europeans. That vast numbers of horses, however, in several stages of evolutionary development, existed here for millions of years prior to that discovery is proved by abundant evidence.

We may well ask in what manner the countless numbers of horses which once roamed our great plains could have been exterminated. Their passing is as mysterious as the sudden disappearance of the millions of "passenger pigeons," which inhabited some of our eastern states up to within the last half century and are now considered extinct.

Recently, while on a visit to the Grand Cañon, I met an old resident who told me that during the last few years he had seen several small flocks of passenger pigeons in the timber of the mesa lands along the Colorado River. He said he had seen and killed many "back East" when he was a boy, and that he knew well the difference between the "banded tailed" or "wood pigeon" of the West, and the passenger pigeon.

Each year as time goes on we obtain new evidence relative to the days of the "long ago." Possibly we may find, a little later on, some evidence showing that scattered herds of horses were still in existence upon this continent at the time of its discovery. Only two years ago (1916) the fossil remains of a horse which connects the prehistoric horse with the horse of today, were discovered in the state of Nebraska.

Our greatest scholars have thought that the true mustangs of the Plains originated from the stock of "Moorish barb" horses which Cortez and other Spanish explorers brought to Mexico in the sixteenth century. During the numerous exploring expeditions of the early Spaniards, one of which extended as far north as the region now occupied by Kansas and Nebraska, no doubt some of the horses used by the explorers escaped from time to time. Stampedes might be caused by storms, or at sight of the herds of bison likely to come thundering by. Probably at times, tired, thirsty horses strayed away from their owners and became lost in their efforts to find water or grass. In this way horses doubtless were scattered over the Plains between three and four hundred years ago—and they multiplied.

At the time of which I write, 1870 to 1880, there were thousands of these inbred beautiful little horses living on the ranges of the West, in the vast country that lies between the valley of the Mississippi River and the Rocky Mountain region. They were true mustangs, named by the inhabitants of Mexico. Their average weight was about eight hundred pounds, I think. The colors that predominated among them were cream, buckskin, or mouse-color. A few black stripes about the legs above the knees, or hocks, and a black stripe along the middle of the back, extending from the mane to the tail, were common markings. The stallions, although they usually had rather heavy manes, did not have a shaggy appearance. They were clean-limbed and their hoofs were black and perfect, as a rule. Never having known the taste of grain, and deriving their food entirely from the native grasses and forage plants, they certainly were hardy.

[1] Of Agate, Nebraska

They could stand more hard riding with no other food than that which they could "rustle" when turned loose, than any breed of horses with which I have ever had experience, either on the Plains or in the mountains. As blacksmiths or "hoofshapers" never had tinkered with their feet or forced them to wear iron shoes, their hoofs were strong and would stand wear over the roughest kind of mountain trails.

I have seen many bands of mustangs on the Plains as far north as the head of the Loup River, Nebraska. North of that point I have never seen any, neither have I heard from any of the old white trappers or the Indians, who lived in that country, that they ever saw any. When the wagon roads were made across the Plains to California, and to the various army posts that were established in the West, horses and mules escaped from the wagon trains occasionally and joined the bands of mustangs. Strange as it may seem, the well-broken, gentle horses and mules which joined the bands of mustangs and lived with them for a few months or years, became, if such a thing could be, more wild and watchful than the mustangs. I am quite sure that a few old, long-headed army mules I have noted ranging with bands of mustangs were about the most wisely wild creatures it has ever been my good fortune to see. Back in Missouri, or some other state, or under the gentle care of some expert government "mule skinner," they had acquired a knowledge of men and their ways. Their extremely delicate sense of smell enabled them to scent a man at long range, especially one who carried about with him a large halo from an old pipe or "chawing plug."

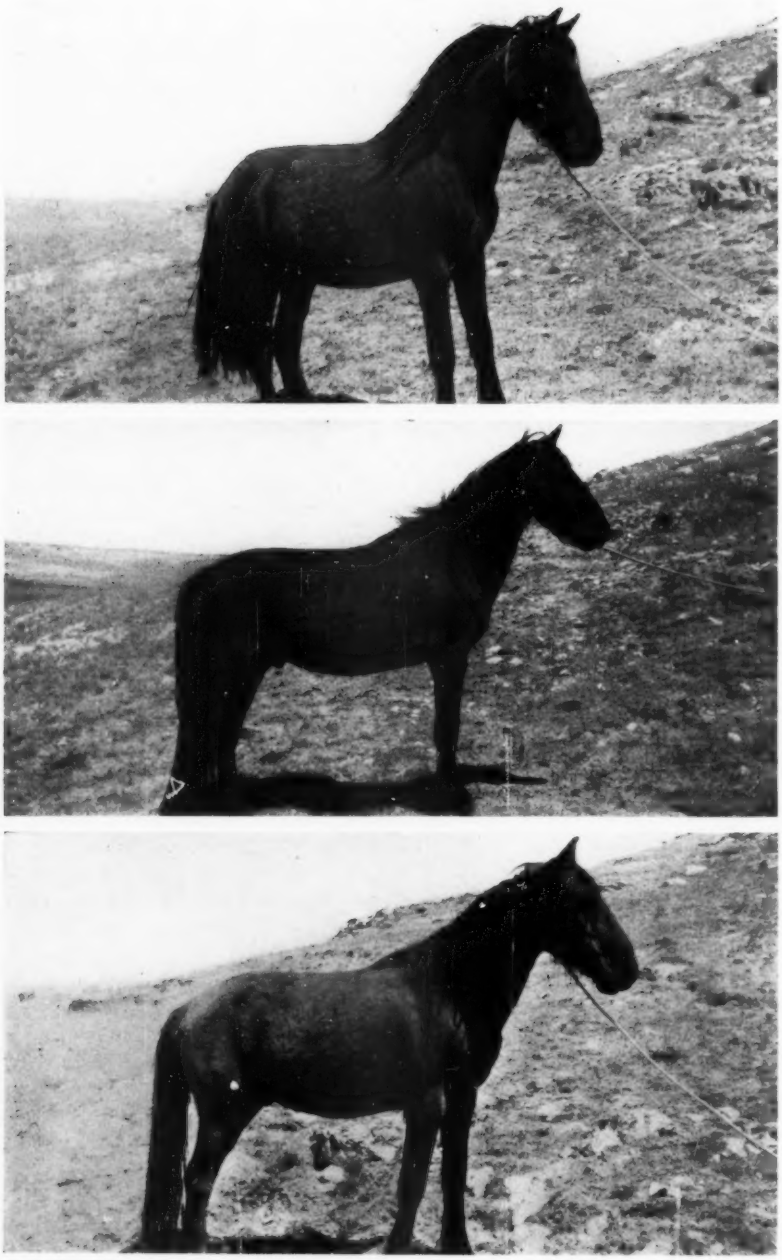
After one of these mules had lived in the open with the mustangs for a few months, the slightest scent of a man at any minute, night or day, would cause it to snort in such a wildly terrifying manner that the entire band of mustangs would stampede, running perhaps forty miles at topmost speed, before they could get control enough of their courage to look back to see what had caused the excitement. I have observed that both mustangs and range horses have a keen sense of smell and are able to scent the trail made by horses with which they have been associated, following it rapidly, over ground where a man could see no sign that horses had passed.

One thing for which the mustangs had to be on the lookout at all times was the big wolf, or "lobo." This cowardly pest was ever hungry for a taste of horse flesh. Animals weakened or crippled from any cause, or very young colts, were easy prey if the wolf could but sneak up and cut their ham strings with his sharp teeth before the defenders in the band saw him. For the strong, active mare or stallion a wolf might show some respect: a thoroughly enraged horse, fighting with its teeth, striking lightning-like blows with its forefeet, and playing a "double tattoo" with its heels, is no plaything for even a pack of wolves to tackle.

Stallions and mares which escaped from emigrant and freighting wagon trains on their way across the Plains, and intermingled with the mustangs, caused the heretofore pure-bred mustangs to become gradually more and more scarce. By 1880 almost all had disappeared from the Plains; and the few mustangs remaining today are to be found only among the herds of Indian ponies on some reservation where the breeding-up process to get larger horses with which to haul freight or till the soil, has not been rigidly enforced. Now and then a pony having the conformation, coloring, and marking of the mustang may yet be obtained from the older Indians, who have long known the good qualities of the mustangs. In a few places so-called "wild horses" may be found, but they are not the original breed of mustangs. They are bands of range-bred horses gone wild or spoiled, usually by someone's bad management—or luck—when trying to corral them. A sudden scare at the entrance to the corral will make horses turn and try to run back on to the range. Should they succeed in one attempt, they will be hard to corral afterward, and if they break back from the corral two or three times, they become a pretty badly spoiled lot of horses—but must not be confused with mustangs.

In the early seventies, while I was working with wild Spanish cattle down in the southwestern part of Texas, getting my early education as a cowboy, I had my first opportunity to learn something regarding mustangs. There were many living on the comparatively small prairies scattered about in the brush country of that region, and a number of men were making a business of catching bands of mustangs to sell in the states to the east and north.

The method employed in the capture was



A DESCENDANT OF THE MUSTANG, AGATE, NEBRASKA

In former years great herds of beautiful wild mustangs roamed the Western Plains of the United States. They were small, averaging about eight hundred pounds in weight, but clean-limbed and very hardy. Cream, buckskin, or mouse colors prevailed, with a few black stripes about the legs above the knees and a similar stripe along the middle of the back from mane to tail. By the year 1880 almost all had disappeared from the Plains, and only an occasional descendant may now be found among the herds of Indian ponies

as follows: In some thicket, a little back from the edge of a prairie large circular corrals were built, high and strong, of heavy posts set in the ground and bound together with green rawhide thongs. The entrance led into a chute or passageway, wide at the outer end and narrowing toward the inner end, where not more than three horses abreast could pass through. This type of entrance prevented the horses from escaping in a rush for the gateway when they found themselves trapped, before the heavy bar poles could be put up and securely lashed. From the outside of the entrance to the corral on either side were built wings extending in the shape of a large V. For a short distance out from the corral these wings, which often extended a quarter of a mile or more, were made very strong, and so high that a horse could not jump over. Then wings and entrance were concealed by green brush.

When the corral and its wings were in readiness, a lot of riders, quite widely separated and moving in a half circle, rode out of the timber and chaparral on the side of the prairie where the wild horses ranged, and the horses, of course, fled before them. The riders at the ends of the half circle then made straight for the ends of the wings of the corral, while the rest of the riders kept the mustangs running toward the corral and prevented any from turning back. The riders drew nearer and nearer together as they approached the corral. As soon as the mustangs were well within the wings, their pursuers closed in on them, yelling, and firing their pistols, whereupon the leaders among the mustangs, on the lookout for any little opening in the green thicket through which they might escape, rushed through the narrow opening at the inner end of the chute, only to find themselves hopelessly trapped. The fright of these horses can be imagined. They rush frantically around and around the corral. Sometimes they all make for one side of the corral, piling up to such an extent that those farthest back when the rush

This shows well the shoulder stripe which characterizes the full-blooded mustang. The following quotation from a letter from Mr. Harold J. Cook, son of the author, will explain that it is to him NATURAL HISTORY is indebted for the illustrations.

"I have not been able to find anywhere photographs of the real 'old time mustang,' so I have done the next best thing I could think of. I caught up a descendant of some of these old horses that we recently bought from the Indians, and took some snap shots of him. I have tried to get these for ten days, but it has snowed, rained, and blown wildcats. The pony has the characteristic back and shoulder stripes. I tried to get a view showing these. In size, build, and make-up he conforms quite well with the type. He has very little if any of the hot blood of the white man's horses in his veins"

started, can climb up over those trampled down in front. When a hundred or more are knocked down and piled up close to the corral fence, some escape by jumping from the pile of struggling horses over the top of the corral. By this method of capture many hundreds of horses are maimed and many killed.

When the horses are securely corralled, the riders generally go to camp and let the terror-stricken animals settle down for a few hours. Then they return to the corral and the real scare for the horses takes place, for the terrible looking creatures who have driven them into that awful pen now climb down from the top of the circle of posts into the corral with them. As the mustangs are somewhat exhausted by their previous attempts to escape, they soon become a panting, foaming, almost breathless mass of horses. Sometimes the old stallions show fight, in which case they are promptly shot. Lassos are then brought into play. The horses are lassoed by the feet, thrown down, and either strong rawhide hobbles or clogs are placed on their front legs.

Hobbles for horses are in common use at this date in many parts of the West, but I never have heard of clogs for horses being used in any part of the West other than the brush country of southwestern Texas. These clogs are made by taking strong, forked sticks about an inch and a half or two inches in diameter and about two feet in length, and lashing them with rawhide thongs on to the front leg of a horse. With these the animal can make little headway when he tries to run. Like a hobbled horse he soon becomes very tired of trying to go at speed.

When all the horses which are neither killed nor injured have been hobbled or clogged, they are usually left in the corral until they are pretty hungry and thirsty. Then the bar poles are taken down and the horses allowed to work their way out of the corral through the narrow chute and into the wings. These wings usually take in some little water hole, or the bend of a creek, where the horses can drink. Riders frighten them back if they try to work beyond the mouth of the wings of the corral for the first day or two. Gradually they are allowed to work their way out on to the prairie to graze during the daytime. At night they are driven back into the corral. After a few days of this treatment, the hobbles and clogs are removed from those horses which are most subdued. At the end of a few weeks the entire herd is freed from hobbles and clogs, having become accustomed to control by riders to the extent of being driven in any direction desired.

I never took any part in "mustang hunts" of this type, but I have watched the performance a few times. It was certainly a pretty cruel business. During the days when I hunted big game in Colorado and Wyoming Territory, a hunting partner of mine, best known as Wild Horse Charlie, was, I think, the first man to make a business of catching mustangs on a larger scale, on the open plains. He called his method "walking them down." In the spring of 1876 he captured several bands of mustangs on the plains of eastern Colorado, driving them into Nebraska and Iowa, where they were sold as saddle or driving ponies. In his method he took three or four good riders and made a camp on the range of the mustangs, at a time when advantage could be taken of moonlight for the work. From some good observation point, a rider would then locate a band of horses with his field glasses, by moonlight. Bright and early in the morning the work of capturing the horses would begin. Mustangs have a habit of settling on a range. When possible, they confine their feeding and their flights from danger to certain boundary lines. This fact is well known to plainsmen.

Upon discovering a band of mustangs, a rider approaches them from a direction opposite to that in which he desires the horses to run. As the mustangs have wonderful sight and are always on the lookout for danger, they take to their heels as soon as the rider comes into view. This rider does not race after them, but follows fast enough to keep them in sight. The other riders, stationed at as good observation points as possible, note the direction in which the mustangs start to circle, in order that each rider in turn may be relieved every few hours during the long chase. At the end of a few hours, the first man to start after the horses is relieved by another rider. He can then go to camp, change his tired saddle horse for a fresh one, and get a little rest. This relay system, continued night and day, never allowing the mustangs to stop for either food or drink, will, at the end of a few days, exhaust them so that the riders can approach and begin to control the turning of the mus-

tangs in any direction desired. Naturally the riders keep them as close to their camp as possible.

The mustangs cover many miles of ground during the first two or three days of the chase—a distance of one hundred miles for each twenty-four hours is not an exaggerated estimate. On about the seventh or eighth day of the chase, or sooner on some occasions, the aged or weaker mustangs, completely exhausted, play out and stop, or some of the aged stallions turn on their pursuers for a fight. Such stallions are shot by the riders, and the exhausted animals lassoed, hobbled, or "sidelined." Sidelining means tying together the front and hind foot on one side of an animal with a pair of hobbles to prevent it from traveling at speed. At the end of the tenth day after the chase begins the wild horses are under such control that they can be driven to some strong cattle corral in the country.

A third method of capture is by "creasing." This is used to capture individual mustangs considered especially valuable because of their beauty, color, conformative marking, or because they show unusual speed. This method has been more talked about than successfully carried out.

To crease a horse, a person must first get within close shooting distance of this most animated target. He must then place a rifle bullet in the top of its neck, grazing the cords of the neck just enough to stun the animal and knock it down so that it can be tied down before recovering from the shock. Not only must one be a mighty good shot, but extremely lucky, to make a success of this method; it is very easy either to break the neck of the animal, simply give it a bad scare and a slight wound, or score a clean miss.

I tried it once but I never attempted to crease a second mustang. While engaged in the work of gathering wild cattle down in Frio County, Texas, I caught sight, on numerous occasions, of a small band of mustangs led by one of the handsomest stallions I have ever seen. He was cream-colored, with white mane and tail. His mane was parted and hung equally heavy on both sides of his neck. He had a black stripe down the middle of his back, and also one around his legs. I discovered that this band of horses was in the habit of drinking from a little pool so located in a washout of an old creek bed that it could be approached from only one side, three sides of the washout having high, perpendicular banks. These creek banks leading to the water hole made wings that were probably about one hundred and fifty feet long. I conceived the idea that if I could hide in the vicinity of this watering place until all the horses, coming to drink, should be in the narrow runway leading to the water, I could dash up to the mouth of the runway and, as the horses rushed past me in making their escape, I could crease the desired stallion with my six-shooter. At that time I considered myself hard to beat, either mounted or on foot, in the use of the six-shooter.

After weeks of waiting, an opportunity to try out my scheme at last arrived. While out hunting for some saddle horses which had strayed from our camp, I saw this band trailing toward the water hole. Keeping out of their sight, I beat them to the place. I concealed myself and my horse in a dense chaparral thicket about one hundred yards from the mouth of the runway through which the horses would go to get a drink. The horses must have felt that there was no danger, for they rushed in a bunch down the runway and into the water, where they made such a noise splashing and pawing about that they did not hear me approach. They certainly got up some action in getting past me when I rode into the runway. As the stallion came rushing madly by, passing within ten feet of me, I made an attempt to crease him. The result was that I broke his neck. At first I thought I had been successful, but when I saw what I had done, I could have cried. Perhaps I did, for I certainly felt very sorry to have taken the life of that beautiful creature. I realized then that, had I thought to use my lasso instead of my six-shooter, he either would have escaped or been mine. Seldom would one find a band of mustangs in such a natural trap with an opportunity to use either lasso or pistol at such short range. I never made another attempt to crease a mustang.

Some writers have told us of certain tribes of Mexican Indians who were possessed of such speed that, starting out on foot, they could run down and capture the mustang. I have been told about both white men and Indians who, on foot, had run down, killing or capturing, many wild animals, including antelope, deer, and mustangs. I have never seen a performance of this kind. I can understand how a man trained to the work of

trailing or tracking game could follow an animal for an indefinite length of time, provided the course followed by the animal led over such ground as to make tracking possible. Unless a man did depend largely upon his tracking qualifications, he would have to lope along at a lively clip for the first forty-eight hours of his chase after a mustang, or lose sight of his game, if the mustang acted in the manner of those pursued by horsemen.

Doubtless, away back in a time when the wild life of our country knew nothing of pursuit by men on horseback, mustangs may have felt safe when out of range of arrows shot from bows, even when the archer was in full view. All wild life seemed to know, or felt it knew, that there was a distance at which it could feel safe, even from its most feared enemy—man. If instinct did protect the wild life at one time, I think it hardly can be depended upon in these days, at least without being very much readjusted. Air craft and automobiles are now aiding the mighty Nimrods in ridding the world of its wild waterfowl and the last of its fleet-footed, pronghorn antelope. Such things as pump guns and rapid-fire, high-power rifles proved too slow.

To me there is a certain grace and beauty about wild creatures that is lost as soon as they become domesticated. They certainly lose their alertness, and my respect and admiration decline in corresponding ratio.

Primitive Ideas on Numbers and Systems of Measurement

By ROBERT H. LOWIE

IT IS sometimes rashly asserted that primitive tribes are incapable of conceiving numbers greater than three or five. Even if such peoples exist—and this seems highly problematical—the lack of terms for any but the lowest numbers would not prove their inability to develop adequate arithmetical notions. This is, indeed, exactly what has taken place among many of our North American Indians, whose conceptions and vocabulary of numbers have been materially enlarged through contact with modern civilization. Under the old conditions of life there simply was no need for such conceptions and accordingly they had not sprung into existence.

Nevertheless, there are probably few, if any, stocks of humanity that are not able to count up to twenty. The reason is obvious: man has twenty fingers and toes. It is interesting and almost startling to find how many of the numeral systems on record have a digital basis,—quinary, decimal, or vigesimal. Thus, Mr. Waldemar Jochelson, of American Museum Jesup Expedition fame, has analyzed the terms of the Yukaghir of northern Siberia. One really means "one finger"; five is derived from the stem for "wrist" or "hand"; ten signifies at bottom "the fingers all together." One hundred formerly marked the limits of Yukaghir numeration and was expressed by doubling the word for "ten."

The Kai, a Papuan tribe occupying the mountainous and wooded hinterland of Finschhafen, New Guinea, regularly use their fingers in counting; they begin with the little finger of the left hand and after finishing both hands proceed to the feet, beginning with the big toe in each case. This practice is strikingly illustrated in their vocabulary. Seven is "two on the other hand"; eleven "one on the foot"; sixteen "one on the other foot." When introduced to the white man's week the Kai logically enough allotted to each finger a day, and he will say, "I shall be back on the thumb," when he wishes to indicate that he will return on Friday.

Remarkably similar is the method pursued by the Tamanac of the Orinoco River. Five means "the whole hand," six is "one of the other hand," eleven "one to the foot," sixteen "one to the other foot." That the same type of numeral system should be found in Siberia, in New Guinea, and in South America

is assuredly a noteworthy phenomenon. We may recognize here some evidence for the lately challenged doctrine of the psychic unity of mankind, for in this case at least the theory of borrowing seems excluded.

Very different from these primitive gropings is the highly developed numerical system of the Maya Indians of Yucatan, which enabled them to designate numbers transcending a million. In fact, two systems were in vogue among them—the one peculiar to the inscriptions on stone monuments, the other distinctive of the fiber-paper books (codices). Confining our attention to the latter, we find a method of numeration by position, in which "the numerical value of the symbols depended solely on position, just as in our own decimal system, in which the value of a figure depends on its distance from the decimal point."[1] Instead of proceeding from right to left, however, in the expression of numbers, the Maya started from the bottom and worked their way upward to the higher positions; and, what is more significant than this purely external arrangement, the basis of the system was not decimal but *essentially* vigesimal. Perhaps the most astonishing feature of the scheme is the development of a zero symbol, for as Tylor[2] puts it: "This invention of a sign for nothing was practically one of the greatest moves ever made in science." The zero was unknown to the ancient Greeks and Romans, and European civilization learned its use from Hindu culture through the intermediation of the Arabs.

To express 20 the Maya did in principle what we do to write 10; that is, they wrote the zero symbol in the first position and the 1 symbol in the second. The numbers from 1 to 19 were all put into the first position and expressed by a combination of dots and bars. One dot represented 1, two dots 2, one bar stood for 5, one bar and four dots for 9, three bars and four dots for 19. The only inconsistency in the system occurs in the third position, which instead of representing the value of 400, that is, 20 by 20, only stands for 360,—undoubtedly because of the number of days in a year since the system had a purely calendric use. Otherwise, however, the vigesimal basis is preserved. A unit in the fourth position equals $20\times360=7200$; and the fifth position represents $7200\times20=144{,}000$. This method of numeration must always rank as a capital achievement of the human intellect.

Primitive ideas on numbers are by no means wholly of a rational cast, however. Precisely as 13 is considered an unlucky number with us, so among most of the ruder cultures numbers are invested with altogether peculiar characters and potencies. In aboriginal North America four generally plays an exceptional part as a mystic or sacred number. Some tribes have conceived the idea that everything in the universe must be arranged in quartets. Thus, in a ceremonial procession there will be four halting places; at each stop the chanters will sing four songs; and in folk tales the heroic exploit is accomplished at the fourth attempt after three trials have miscarried. In other regions the mystic number may be five as among the Paviotso of Nevada, or nine as in parts of Siberia, or ten as among the Pythagorean philosophers of ancient Greece. Sometimes different peoples entertain the most contradictory notions as to the same number. Thus, while seven is highly revered in parts of Asia, the Kikuyu of British East Africa consider it the most unlucky of numbers when their shamans forecast the future by pouring out counters from a gourd container after the manner of a dice game.

Let us turn from primitive notions of numbers to their practical application. Savages are indeed superb observers and are able to record their impressions in graphic fashion, but they rarely require precision of statement. Primitive man is incomparably better acquainted with the fauna and flora of his habitat than is the average college student with his own environment, but the data he has accumulated are raw material for science rather than science itself. His standards of measurement accordingly cannot be expected to attain a higher plane than those current, say, among the illiterate peasantry of Europe.

A concrete illustration will make the matter clearer: The Baganda of East Africa, whose intricate political organization and well-developed trade relations suggest an unusual degree of intellectual sophistication, measured building poles by the "foot": one foot was placed immediately before the

[1] Morley, S. G., Smithsonian Institution, *Bureau of American Ethnology*, Bulletin 57, p. 129.

[2] Tylor, E. B., *Anthropology*, D. Appleton & Co., 1904, p. 315.

other along a felled tree and the length determined by counting. But there was apparently no attempt either to standardize the foot or to bring other modes of linear measurement into any consonance with the foot. On some occasions the outstretched arms formed the standard, in measuring fences and roads the cubit was used, while the span from the tip of the thumb to the top of the second finger served to determine minor distances. What holds for linear measure applies in equal degree to dry measure. Salt was tied up in small packets approximating a tablespoonful; in larger quantities it was sold by the basket holding about ten pounds. Sweet potatoes, however, were bundled up into thirty-pound lots, firewood was tied into bundles of about forty pounds. Beer was measured by the gourd or for brewing purposes by the tub,—a vessel six feet long by two feet six inches wide and eighteen inches deep.

Judged by the Baganda standards, the measurements of at least the greater number of American tribes are on a lower plane, although it is inconceivable that the masons and artisans of Yucatan or Peru were without adequate means of determining lengths. Oddly enough the foot, which plays so important a rôle in the Old World, was apparently never used among the North American Indians. It also seems strange that there is no evidence for the use of scales and weights nor of liquid or dry measure. The kind of linear standards employed may be illustrated by the case of the Pima of Arizona. Here a yardlike measure is employed, that is, the distance from the center of the breast to the finger tips. After the coming of the Caucasian a definite series of values was established on this basis. Ten of these "sticks" were made equivalent to one "cut" of calico, equaling one load of wheat, or about 150 pounds and ten cuts or loads were reckoned equal in value with one horse. Land is measured by steps of about five feet, while long distances are estimated in terms of a day's journey.

To turn to still another region of the globe. In the Banks Islands, Melanesia, the fathom is the favorite unit and appears prominently in the measurement of money, a measuring rod serving as an auxiliary device. In monetary transactions two pegs are stuck into the ground a fathom apart, and strings of shell money are looped round them until the specified number of fathoms has been told off. Another standard is represented by the distance from one shoulder to the tips of the extended fingers of the other hand; more rarely the Banks Islanders employ the distance from the elbow to the finger tips of the same hand. A short measure is based on the length from the wrist to the finger tips.

The study of primitive methods of measurements has been much neglected and it is thus impossible to make a broad comparative statement. There are indications, however, that anthropologists are becoming interested in ascertaining details about the concrete knowledge possessed by the peoples they visit, and in this connection measurements will inevitably be investigated and will assuredly prove a fascinating chapter in some future history of science.

An Indian Peace Medal[1]

With quotations from the original diaries of the Lewis and Clark Expedition, 1804–1806

By CLARK WISSLER

A SILVER peace medal of the Jefferson medallion type, found in an Indian grave on the banks of the Clearwater River, Idaho, recalls one of the most interesting events in the exploration of this continent—the Lewis and Clark Expedition. The medal was discovered in 1899 by Mr. Lester S. Handsaker, an engineer engaged on the construction of the Northern Pacific Railroad. Inasmuch as the railroad follows almost the exact route of these early explorers, and the records show that they distributed many such medals among the Indian tribes that they encountered, it seems unmistakable that the one thus brought to light was carried on that famous expedition.

When Lewis and Clark made their memorable journey from the mouth of the Missouri to where the Columbia empties its waters into the Pacific Ocean, no more virgin country than that traversed could be imagined. Indians and wild animals were the sole occupants of the great territory afterward known as the Louisiana Purchase, but which, at the time the undertaking was conceived, was still the property of France. At the suggestion of Jefferson, Congress, in January, 1803, made an appropriation of $2500 to defray the expenses of an expedition, to be under the leadership of Captain Meriwether Lewis and his friend Captain William Clark, for the purpose of exploring the Missouri and Columbia rivers and their principal branches. With this small sum were purchased mathematical instruments, arms, camp equipage, medicines, provisions, and presents for Indians. The last item included articles of clothing, beads, paints, flags, knives, tomahawks, and medals.

An account of a council meeting with the chiefs at Fort Mandan, on the Missouri River six or eight miles below the mouth of the Knife River, where the expedition passed the winter of 1804–05, states: "We proceeded to distribute presents with great ceremony. One chief of each town was acknowledged by a gift of a flag, a medal with the likeness of the President of the United States, a uniform coat, hat and feather. To the second chiefs we gave a medal representing some domestic animals and a loom for weaving; to the third chiefs, medals with the impression of a farmer sowing grain."

Peace medals for promoting friendly relations with the Indians were manufactured in America as early as the year 1757 by a

[1] This medal was presented to the American Museum of Natural History in 1901 by Mr. Edward D. Adams, of New York City.

Philadelphia association composed chiefly of members of the Society of Friends. One of the first issued had on the obverse the raised head of King George II and on the reverse the sun, an Indian sitting at a camp fire, and a white man offering him a pipe of peace. After the Revolution such medals always bore the head of the President in office at the time of its manufacture. One struck in 1792, bearing the profile of George Washington, was presented to Red Jacket, Chief of the Iroquois and last of the Senecas, who never afterward was known to be without it.

The Jefferson medal, which differed in design from that issued by Washington, was made of bronze in three sizes. The smallest was also struck in silver and was furnished with a stem and ring for suspension. All sizes bore the same design: on the obverse a medallion bust, with the legend, "Thomas Jefferson, President of the U. S., A.D. 1801," and on the reverse clasped hands, pipe and battle ax crossed, and the legend, "Peace and Friendship." It was a silver medal of this type which was found by Mr. Handsaker in the Indian grave beside the Clearwater River in Idaho; it now forms a part of the collections of the American Museum of Natural History as a gift from Mr. Edward D. Adams of New York City. When discovered it was wrapped in many thicknesses of buffalo hide.

Both Captain Lewis and Captain Clark kept full diaries of the events of each day while on the expedition. These original diaries have been published precisely as written with the quaint spelling and capitalization used by these explorers.[1] On consulting them we find that in September, 1805, on their way to the Pacific, they met with Nez Percé Indians on the Clearwater near the spot where the medal was found. We cannot, of course, be sure that the medal in the Museum was given out here, but we do see by these diaries that the explorers gave out medals.

Under date of September 21, 1805, Clark wrote:

"... passed down the river 2 miles on a steep hill side at 11 oClock P.M. arrived at a camp of 5 squars a boy & 2 children those people were glad to see us & gave us dried sammon one had formerly been taken by the Minitarries of the north & seen white men, our guide called the chief who was fishing on the other side of the river, whome I found a cherfull man of about 65. I gave him a Medal."

Again on September 23, 1805, the diary states that another medal was given out.

Upon the return journey on May 10, 1806, Captain Lewis made the following entry in his diary. After having stated that he met near the Clearwater some of the Nez Percé Indians who received them so kindly and treated them with such hospitality Lewis records the event in his diary as the most happy so far experienced. He says:

". . . This is a much greater act of hospitality than we have witnessed from any nation or tribe since we have passed the Rocky mountains. in short be it spoken to their immortal honor it is the only act which deserves the appellation of hospitallity which we have witnessed in this quarter. we informed these people that we were hungry and fatiegued at this moment, that when we had eaten and refreshed ourselves we would inform them who we were, from whence we had come and the objects of our resurches. a principal Cheif by name Ho-hâst-ill-pilp arrived with a party of fifty men mounted on eligant horses. he had come on a visit to us from his village which is situated about six miles distant near the river. we invited this man into our circle and smoked with him, his retinue continued on horseback at a little distance. after we had eaten a few roots we spoke to them as we had promised, and gave Tinnachemootoolt and Hohâstillpilp each a medal; the former one of the small size with the likeness of Mr. Jefferson and the latter one of the sewing [sowing] medals struck in the presidency of Washington. we explained to them the deighn and the importance of medals in the estimation of the whites as well as the red men who had been taught their value."[2]

It is interesting to note in this last entry the specific mention of a Jefferson medal as having been presented to one of these chiefs. As this region has always been the home of the Nez Percé, it is a fair assumption that the medal found was from the grave of one of this tribe. It is of course even possible that it was the grave of this particular individual, though we must not forget that many similar medals were distributed, as the preceding extracts from the diaries suggest.

[1] *Original Journals of the Lewis and Clark Expedition*, 1804–1806, Vol. 3, pp. 81, 85 (New York, 1905).

[2] *Original Journals*, Vol. 5, pp. 15–16.

"Billy the Boy Naturalist"[1]

AN attractive little volume with a title that will appeal to children has just appeared from the pen of Dr. William A. Murrill, assistant director of the New York Botanical Garden. When one delves into it, he finds that it is autobiographical, that Billy is Dr. Murrill himself when a boy, that it is "the true story of a naturalist's boyhood." But the story is not told in the usual biographical way,—instead the book consists of many short stories of boyhood experiences, arranged in four chronological groups, or chapters, as the author calls them. For the most part, the stories are unrelated to one another, that is, each one is complete in itself, being simply a record of an incident that had permanently impressed itself upon a normal boy's memory. To write these down and put them together in book form was a happy idea. It is so pleasing that one cannot help wondering why some one has not thought of doing this kind of thing before.

To think of an eminent botanist, a leading authority on fungi, turning aside to write this volume, reminds one of Charles Lutwidge Dodgson ("Lewis Carroll"), author of works on higher mathematics, when he wrote *Alice's Adventures in Wonderland*, or of Robert W. Wood, professor of physics in Johns Hopkins University and author of works on optics, when he produced *How to Tell the Birds from the Flowers*. But the work under consideration differs from the above juvenile books in that it is really true.

Grown-ups, who were born and reared in the country, will read it because it will recall, as pleasant memories, identical or similar experiences which probably have not been thought of for years, such as "spelling bees" and playing prisoner's base at school, and "husking-bees" and sorghum-molasses making at home. Young people will enjoy these and the other incidents, such as catching a fish with a pin hook, exploits with a home-made bow and arrow, collecting butterflies, fighting fire on the mountain, and catching young rabbits at wheat-cutting time when they ran out as the field of standing grain got smaller and smaller.

These stories will make capital supplementary reading for use in the elementary grades in the public schools and also for use in the home. They combine good human nature with good natural history.—G. C. F.

[1] Murrill, William Alphonso, *Billy the Boy Naturalist*, the true story of a naturalist's boyhood in Virginia just after the Civil War. Pp. i–xii, 1–252. Forty-three half-tone illustrations from photographs. Published by W. A. Murrill, Bronxwood Park, New York City, 1918.

"Adventures in Beaver Stream Camp"[1]

CAPTAIN DUGMORE is well known as nature writer, photographer of African big game, and, more recently, for his services in the British Army. He has chosen the present tale, primarily one for boys, as a vehicle to present information about the Newfoundland caribou; and among a number of full-page illustrations are four of his photographs of these animals from life.

The narrative relates the experiences of two boys, castaways on the wild coast of Newfoundland, with only the simplest tools and, to begin with, a rudimentary knowledge of woodcraft. It tells how, when the necessity arises, they succeed in spending the winter in comparative comfort and safety, depending entirely on their own resources, and with the caribou forming their principal meat supply. The story is full of wholesome adventure.

Civilized man, separated fortuitously from his environment, has often been known to perish from pure abstract mental helplessness, and a story of this nature has real educational value.

Stefánsson tells us how, by following the customs of the natives, he has been able to live in comfort in the Arctic under conditions where polar expeditions have perished. There is sound philosophy in the traditional reply of the Indian, when asked if he were lost: "Indian right here. Tepee lost"; or, in the closing words of Captain Dugmore's story: "'You see, Mother,' Charlie added, 'we were not lost, only mislaid.'"—J. T. N.

[1] *Adventures in Beaver Stream Camp; Lost in the Northern Wilds*," by Captain A. Radclyffe Dugmore. Doubleday, Page & Co., 1918.

Sight Conservation Classes in New York Schools

By FRANCES E. MOSCRIP

Inspector of Classes for the Blind

THE Board of Education of New York City is conducting classes for partly sighted pupils, known as "sight conservation" classes. This work was inaugurated in the winter of 1917 and has grown until the classes at present number nineteen in three of the boroughs of Greater New York. The centers are located in various elementary schools with registers ranging from ten to eighteen pupils each. The classrooms are selected with a view to even distribution and proper diffusion of light. Provision for ample blackboard space is made on account of the nature of the instruction given to the partly sighted pupils. To avoid undue fatigue and to facilitate the handling of large books, maps, and other objects, the desks and seats are placed on movable bases, and large tables and chairs are provided for the use of the pupils. The teachers assigned to these classes are those who have had experience in the regular grades and whose temperaments and special aptitudes are such as to enable them to develop handicapped children.

The need for sight conservation classes sprang from observation of pupils with some sight in the classes for the blind, who rebelled against finger reading and persistently used their impaired vision to read the embossed print, and from the existence of numbers of children in regular grades who were unable, because of short-sightedness and other eye defects, to keep up with their classes. Our classes are operated much the same way as are the classes for myopes in London, which have been conducted for a number of years.

The purpose of these classes is twofold, the hygienic care of the child and his educational development. A clinic under the supervision of the Board of Health, authorized by the Board of Education, is conducted for the refraction and treatment of the eyes of the pupils and candidates of the special classes, and for the control of abnormal physical conditions arising from eye trouble or its cause.

The character of the instruction given to these pupils does not impose eyestrain. Their oral lessons are received in the regular grades with the normally sighted children, and such of the written work as is feasible is done in the regular grades. Most of the written work is done in large type in the special classroom, and for short periods of time. The blackboards are utilized for this purpose. Masses of figures are not given either for reading or writing. The reading lessons are conducted by special teachers by means of charts and clear type readers. The notes in the various subjects are prepared by the special teacher in print or script more than double the size of the ordinary print of textbooks. Manual work involving little or no use of the eyes, such as knitting, chair caning, basketry, cooking, and the larger forms of carpentry, is given to pupils of sight conservation classes. Typewriting by the touch system is also taught.

The sight conservation classes are making possible lives of usefulness and enjoyment for those who, handicapped by poor sight, are unable to receive their education in the regular way. The classes are also placing emphasis upon the improvement of general educational methods and the necessity of properly lighted schoolrooms. The special attention given to the care of the eyes, and to the development of thought, initiative, and pleasing personality, will fit the pupils of these special classes for responsible positions in salesmanship, insurance, social service, and various lines of farming. Occupations like these present no risk to eyesight. The investment in work of this nature is more than justified in the saving to the state on its work in connection with its care of dependents.

Notes

ATTENTION is called to the change in title of this magazine from AMERICAN MUSEUM JOURNAL to the old, honorable, and historical name NATURAL HISTORY. A change has been contemplated for two years or more, partly to avoid confusion with other publications known as "Museum Journals" and partly because the magazine for these years has not restricted itself to a consideration of the American Museum's work and interests. As expressed many times by the Editor in letters to contributors, the magazine would like to feel that it stands as a medium of expression between authoritative science in America and the people, a place for publication of readable articles on the results of the scientific research and thought of the nation for people who are not technically trained. These people have neither time nor desire to pore over technical, unreadable articles, but nevertheless are intelligently, practically, and often profoundly interested. NATURAL HISTORY would like to stand for the highest type of authoritative natural history, expressed by the investigators themselves, by explorers, by the accurate observers in laboratory or field. In addition it desires to interpret the technical publications of our scientific thinkers, if not by popular articles by the same authors, then through reviews by other well-known scientific thinkers, these "reviews" being, as suggested, readable discussions of the given subject apropos of the technical work. It would also of course report phases of the educational work being accomplished by the scientific departments of the United States Government and by the various scientific institutions of the country, especially those of the museum type.

There has been so much shallow, inaccurate, "popular" science, nature study, and natural history, written by persons untrained in science and with distorted imaginations, that a prejudice still remains in the minds of some scientists against putting their observations and conclusions, even when of great value for the layman, into readable form. But the time of such suspicion and condemnation against the mere form of expression of an idea is well-nigh past, and the greatest scientific men of the country are daily proving their willingness and desire to write in a way to be understood not only by the trained, technical man, but also by the man with no knowledge of the shorthand of the scientific vocabulary.

We need especially to have a knowledge of nature and science today. The day of necessity has come for conservation of the world's natural resources and preservation of animals fast becoming extinct; there is seen approaching the time of conscious control of evolution; and just ordinary culture demands in the present decade knowledge of science in addition to what it has always demanded in literature, music, and art. And these reasons do not take account of the added joy in life that comes from a knowledge of nature. We people of today need to know the book of the earth, to study it as a Bible, feeling the divinity in it. NATURAL HISTORY hopes to meet this need in part.

WE welcome the good news that the Royal Museum of Natural History in Brussels escaped unscathed the ravages of the Germans. There has been sent to *Nature* an extract from a letter recently written by Louis Dollo, professor of palæontology in the University and Conservateur of the Royal Museum, reporting "that everything is well here, that *our Museum is intact*, that absolutely nothing is lost, and that we are safe!"

THE seventy-first meeting of the American Association for the Advancement of Science was held at Baltimore in December. Of the four hundred or more addresses, many were concerned with problems connected with the war, but the program as a whole showed a quick adaptation to the broader problems of reconstruction now confronting the country. That the experiences of the last two years have left a marked effect on American scientists was particularly brought out in the paper by Dr. George E. Hale on "The National Research Council," in which he discussed the past results and the future possibilities of the Council as a permanent body.

FOLLOWING the inauguration of national scientific organizations such as our National Research Council, there has been under way the organization of an international body

for the promotion of scientific research. Representatives of the scientific academies of the Allied Countries and the United States held a meeting last October in London. A Committee of Inquiry was appointed which met later in Paris and constituted itself as a temporary International Research Council with the object of becoming a Federation of National Councils. A permanent executive committee of five was named which is to have its seat in London. There are great possibilities for international coöperation in scientific research, the internationalization of great laboratories, the exchange of publications, and the preparation of bibliographies. Above all, the manifest spirit of coöperation will certainly prove a stimulus to scientific workers.

SCIENTISTS have recently called attention to the need of replacing German in certain classes of scientific literature with English. The prevalence of German as a scientific medium is exemplified by the fact that of the 286 journals listed in the *International Catalogue of Scientific Literature* under general biology, 169 are in German and only 49 in English. There has been a similar German conquest in the case of the yearly reviews and great compendiums of scientific advance. It is suggested that the collection and publication of scientific information might well fall among the activities of the National Academy of Sciences which has recently been requested by President Wilson in an Executive Order to take over and perpetuate the work of the National Research Council in the stimulation and formulation of "comprehensive projects of research," in the promotion of coöperation, and in the gathering and collating of "scientific and technical information at home and abroad, in coöperation with government and other agencies," and the rendering of "such information available to duly accredited persons."

A FITTING memorial to the memory of Theodore Roosevelt is the greatest of our national parks which is now being established in the Sierra Nevada as an extension of the old Sequoia Park. Along its eastern boundary runs the main ridge of the Sierra, crested at the south by Mount Whitney, the highest peak in the United States. Three rivers rise among the mountains of the new park, the Kaweah, the Kern, and King's. It is said that Tehipite Valley, through which flows the middle fork of King's, excels Yosemite Cañon in grandeur. The former Sequoia Park with its giant *Sequoias*, the "big trees" of California, is drained by the Kaweah River. The Roosevelt National Park is to be preserved for the true lover of the out-of-doors who may still lose himself on the long trails and snowy peaks in this heart of the American wilderness.

DURING the war and the excessive demand for coal, attention has been turned toward the Arctic, especially to the island of Spitzbergen where effort alone is required to create one of the chief coal-producing regions of the world. It is said that in 1918 the shipment to Scandinavian ports reached 100,000 tons. It has been known for some time that vast quantities (estimated as at least 4,000,000,000 tons) of good steam-coal are present in this Arctic land and a cargo was shipped to Europe as early as 1899. In later years American, British, and Swedish companies have mined more or less unsystematically and in 1912 it is said that one company alone shipped out about 40,000 tons. Iron ore in unknown quantity, as well as other mineral products, is also present, but exploitation is hampered, especially by the lack of definite political control in the island.

PRESIDENT WILSON, while on his visit to Europe, has been signally honored by the learned societies and universities of the Old World. The University of Paris took this occasion to confer their doctorate, *honoris causa*, before a distinguished gathering in the Sorbonne. In acknowledging the honor conferred upon him the President delivered a brief address contrasting especially the two systems of culture between which the war has been waged. "I agree," he said, "with the intimation which has been conveyed today, that the terrible war through which we have just passed has not been only a war between nations, but that it has been also a war between systems of culture; the one system the aggressive system, using science without conscience, stripping learning of its moral restraints, and using every faculty of the human mind to do wrong to the whole race; the other system reminiscent of the high traditions of men, reminiscent of all those struggles, some of them obscure, but

others clearly revealed to the historian, of men of indomitable spirit everywhere struggling toward the right, and seeking, above all things else, to be free. . . ."

The ancient universities of Italy also honored him on his brief trip to Rome and he was elected a member of the Accademia dei Lincei, the oldest existing scientific society in the world. The universities of Bologna, Rome, Padua, and Florence all sent deputations to bear their greetings and confer various degrees. In England the President was unable to stop at Oxford or Cambridge, but he had opportunity to meet many of the leading representatives of art, literature, and science at the state banquet tendered him at Buckingham Palace.

THE construction of a connecting pathway across Central Park between the Metropolitan Museum of Art and the American Museum of Natural History, proposed by Professor Henry Fairfield Osborn, gives occasion to Mr. Lewis Mumford, in the *Scientific Monthly*, to discuss recent tendencies in these two museums. They have changed from mausoleums of ancient art and animal remains to educational institutions which respectively illustrate to their visitors the past history of man's handicraft and display the facts of natural science in such a way that the student will be instructed by their order and surroundings. The arts have grown up in response to natural social demands, therefore, artistic productions, to be rightly understood, must be taken, so far as possible, in their natural context and not viewed as unrelated fetishes for some manner of beauty worship.

The Metropolitan Museum, notably in the Swiss, the Georgian, and the Queen Anne rooms, is giving expression to this organic view of art with scenes that impress by their unity rather than confuse by their diversity and multiplicity. Similarly, the Natural History Museum is taking advantage of the artist's vision in the reconstruction of primitive life, in the arrangement of animal habitat groups, and in the general organization of its collections so as to tell a connected story of the natural history of the earth and its inhabitants. The landscape artist and the animal sculptor have been called upon to assist in laying out this panorama. The two museums are accordingly becoming complementary in their methods, the one borrowing from natural science an organic and social conception of art, while the other is recognizing the aid which the fine arts can lend to the study of nature and man.

AMONG foreign honors bestowed upon Americans during 1918 may be noted the election of Colonel Henry S. Graves, of the United States Forest Service, to the Royal Scottish Arboricultural Society of Edinburgh, and the promotion of Dr. Alexis Carrel, of the Rockefeller Institute, to the rank of Commander of the Legion of Honor. Dr. Simon Flexner also received the title of Officer of the Legion of Honor and was elected a corresponding member of the Société des Hôpitaux.

DR. ALEŠ HRDLIČKA, curator of the Division of Physical Anthropology at the United States National Museum, was recently elected an honorary fellow of the Royal Anthropological Institute of Great Britain and Ireland.

UNDER the heading "Notes from a Traveler in the Tropics," Major Frank M. Chapman writes in *Bird Lore* of casual observations on bird life along the route of his journey to South America for the Red Cross. The fall and winter seasons are not propitious for finding birds in our southern states or in Cuba, as the southern migrants have disappeared and the winter residents have not yet arrived from the north, but on the Isle of Pines, off the coast of Cuba, Major Chapman was entertained by many feathered hosts, including the *Anis*, a common species of Cuba, whose whining whistle is one of the very few really unpleasant bird notes. Dr. Chapman sailed from Havana to Colon to visit the Panama Red Cross and the extremely active Canal Zone Chapter. In passing the Gatun Lake he noted that the dead trees, killed by flooding this great area, were disappearing and that this partly artificial body of water gives promise of becoming one of the most beautiful lakes of the tropics. Its charms are as yet undiscovered by the birds—except for a few brown pelicans, cormorants, and ducks—but its forested shores and rocky islands are certain to afford a future home for the tropical migrants.

THE Aëronautical Society of America, at its meeting January 9, elected Mr. Carl E. Akeley, of the American Museum, to life membership in recognition of his important invention of a camera especially designed for use in aëroplane work.

WE quote the following from *El Palacio*, the journal of the Museum of New Mexico: "Indian Commissioner Sells is giving emphatic praise to the part taken by the Indians in the war. Out of 33,000 eligibles for military duty, more than 6500 served under the flag in the Army, 1000 were in the Navy, and 500 were regularly engaged in other war work. More than 6000 of the enlistments were voluntary. Indians bought Liberty Bonds until now an equivalent of a $50 bond is held for every man, woman, and child of the Race."

AT THE annual meeting of the American Anthropological Association, held in December in Baltimore, Dr. Clark Wissler was elected president of the Association and Dr. Pliny E. Goddard was reëlected editor. A plan for a future permanent research body in connection with the National Research Council was considered and referred to Professors Franz Boas, Alfred M. Tozzer, and Dr. Aleš Hrdlička for definite formulation.

DR. H. J. SPINDEN, of the anthropology department of the American Museum, has just returned from an archæological and ethnological expedition to Central America and Colombia, where he acquired extensive collections of textiles, pottery, mesh bags, and other articles of aboriginal handicraft. In eastern Nicaragua he studied the social organization, arts, and ceremonies of the Sumu and Misskito Indians. He found these Indians still wearing the style of sleeveless cotton jacket, with designs of interwoven egrets' down, that Columbus described in the account of his fourth voyage. Archæological explorations were conducted in Honduras and Nicaragua. In the latter country he discovered heavily forested regions virtually devoid of population, although the archæological remains indicated that they were once inhabited by a relatively highly civilized people. Apparently more savage tribes have come in recent times from South America and forced out the indigenous population. In the republic of Colombia Dr. Spinden examined the public and private collections of native artifacts, including golden vases and figurines from the Cauca River Valley which are the most beautiful of their kind to be found in the New World.

A BRONZE tablet, commemorating the one hundredth anniversary of the birth of Lewis Henry Morgan, is now on exhibition in Memorial Hall of the American Museum. Lewis Henry Morgan was in many ways the "father of American anthropology." After publishing the *League of the Ho-dé-no-sau-nee or Iroquois*, he became aware of the similarity between the Iroquois system of reckoning relationship and that found among the Ojibway. As a result of this comparison he made an extensive study embodied in *Systems of Consanguinity and Affinity of the Human Race*, which is the pioneer work on primitive social organization. The general ornamentation of the tablet is representative of Indian wampum belts, one of which is a record of the famous Iroquois League. Morgan was adopted by the Seneca Tribe of the Iroquois in 1842. The commemorative tablet is to be sent to Wells College in Aurora, New York, Morgan's birthplace.

THE inauguration of *The International Journal of American Linguistics* under the editorship of Professor Franz Boas, of Columbia University, and Dr. Pliny E. Goddard, of the American Museum, with the cooperation of Professor Uhlenbeck, of Leiden, and Dr. W. Thalbitzer, of Copenhagen, fills a previously unoccupied field in anthropology. Two numbers of the new journal have already appeared, the first containing a general introduction by Professor Boas in which he sets forth the most pressing needs and problems of American linguistics.

MR. CLARENCE B. MOORE has added another monograph[1] to his many publications on American archæology, giving the results of recent explorations in Florida and Alabama. The aborigines of this region originally practised the custom of "killing" or breaking a hole into the pottery which they buried with their dead in order that its soul might accompany its previous owner. So expensive a custom, however, was later re-

[1] *The Northwestern Florida Coast Revisited* (Journal of the Academy of Natural Sciences of Philadelphia, 2d Series, Vol. XVI, part 4, 1918).

fined into the use of cheap pottery manufactured especially for funeral purposes, with a hole already made in the bottom or even with genuine ornamental openwork. Inasmuch as the Indians of this neighborhood made their deposits of earthenware to the east of their burial mounds, Mr. Moore and his party were able to obtain large amounts of material, local searchers having contented themselves usually with digging a hole in the center of the mound.

THE Museo Nacional de Chile occupies a beautiful and spacious building constructed for the International Exposition in 1875, in the *Jardin des Plantes* or Quinta Normal, of the old Spanish city of Santiago. This city, with a population of 400,000, is one of the most beautiful of the world, and besides being the capital of Chile, is also the center of that country's culture and learning. In the Museum the departments of archæology, geology, botany, and zoölogy are represented by extensive native and exotic collections; and for printing the scientific contributions to Chilian natural history the Museum publishes a *Boletin del Museo Nacional de Chile* and a series of *Anales*. The institution had its inception in the work of the French naturalist, Claude Gay (author of the *Historia fisica y politica de Chile*, 24 volumes, Paris, 1843–51), who visited the country (1828–42) to study the natural history. It now fills a prominent place in Chile's educational and scientific progress. Dr. Eduardo Moore has been the director since 1910.

SECRETARY LANE, of the Department of the Interior, has announced the renaming of the national monument on Mount Desert Island, Maine, as Lafayette National Park. This reservation, formerly known as the Sieur de Monts National Monument, has been singled out to commemorate our ancient alliance with France. It was discovered and named by Champlain in 1604.

DR. SIMON FLEXNER, the renowned pathologist and director of the laboratories of the Rockefeller Institute for Medical Research, was elected president of the American Association for the Advancement of Science, at their recent meeting in Baltimore. Dr. Flexner has been serving during the war as a Lieutenant Colonel in the Medical Corps.

Courtesy of the Bulletin of the Pan-American Union

The Museo Nacional de Chile, in the old Spanish city of Santiago. It carries on important work in exploration and research and coöperates with the schools by means of exhibits and lectures

NATURAL HISTORY owes an apology to its readers that the index for 1918 is included with the January instead of the December number and that there has been delay in the issuance of these two numbers. Fortunately the February number is in press as the January number appears. Attention is called to what will prove the unusual interest of the March number, including articles descriptive of the total eclipse of the sun in June, 1918, by Professor S. A. Mitchell, director of the Leander McCormick Observatory of the University of Virginia, painting the solar corona, by the artist, Howard Russell Butler, with reproductions in color, the wild flowers of Greenland, by W. Elmer Ekblaw, of the Crocker Land Expedition and the University of Illinois, and the unknown jungle of Panama, by Lieutenant Colonel Whelen, of the United States Army.

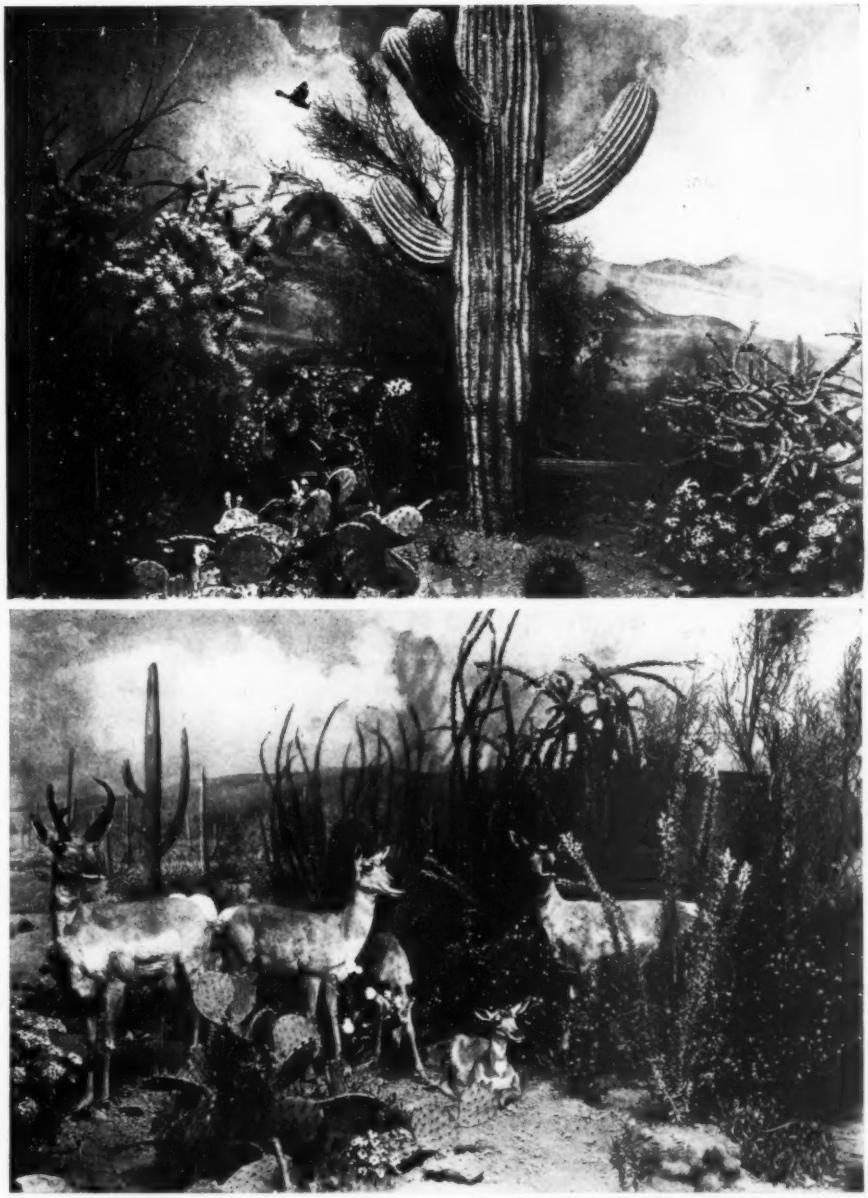
CANADA is to be congratulated on possessing the second largest telescope in the world, recently installed in the Dominion Astrophysical Observatory near Victoria, British Columbia. Dr. J. S. Plaskett, director of the observatory, narrates the history of the construction of this gigantic seventy-two inch reflector in the *Journal of the Royal Astronomical Society of Canada*. The glass disk, cast and annealed by the St. Gobain Glass Co., Charleroi, Belgium, narrowly escaped a possible tragic ending, being shipped from Antwerp but one week before war was declared, in July, 1914. The cast was 73½ inches in diameter and 13 inches thick, with a central hole about 6 inches in diameter. The rough mass weighed about 5000 pounds, but when finished it was reduced to 4340 pounds. The great and difficult task of giving the final polish to the mirror required nearly two years, but the result is a credit to Brashear Co., of Pittsburgh, in whose hands the work was, as the maximum deviation of the curve of the glass from theoretical perfection is but one eighth of a wave-length. The mounting of the telescope was constructed by the Warner and Swasey Company, of Cleveland. No difficulty was experienced in setting up the parts and the instrument was in use a week after the delivery of the mirror to Victoria.

THE National Association of Audubon Societies has issued a call to the nature lovers of America to erect a Roosevelt Memorial Fountain. Their announcement is in the form of an appreciation of Roosevelt, bearing on the cover the legend: "He taught and practiced clean, straight sportsmanship, with a power that has caused thousands of men afield to walk in straighter paths."

THE work of the wardens engaged by the National Association of Audubon Societies to guard the Federal Bird Reservations, the egret colonies, and the breeding islands along the Atlantic Coast, has been affected in no way by the war. These wardens report that the egrets have fared better than the sea birds, which have had but an average year, many natural accidents destroying the eggs by thousands.

A NEW and crafty method of egret destruction has been reported. The hunter erects a canvas screen near the egret rookery. He then flashes a strong light into the rookery, which startles and bewilders the birds. As the stream of light is changed from the rookery to the white screen the victims follow and dash to their destruction against the canvas. It is said that this trick was suggested by the accidental killing of some birds in a similar way on the Florida coast, when a steamer's searchlight was turned alternately on an egret rookery and on the white canvas of a passing sailboat.

THE Brooklyn Museum has recently constructed and opened to exhibition a Desert Life Group which is one of the largest habitat exhibits ever conceived. It represents what might be termed the "optimum life conditions of the North American Desert" as seen in spring in southwestern United States or northern Mexico. The dominant plants are, of course, giant cacti, around which are grouped models of the various smaller species of cactus and other desert plants collected near Tucson, Arizona. The animal representatives of the desert fauna were taken by Mr. Robert Cushman Murphy on a hunting trip to northern Lower California. Five specimens of pronghorn antelope are prominent in the right half of the group. The antelope might at one time have been taken in Arizona, but the species is now so far extinct that it can be found only in out of the way and inaccessible haunts. To the artists and modelers of the group there were presented unusual problems, particularly in the reproduction of the cacti, and the results are a brilliant tribute to their craftsmanship.



Courtesy of the Brooklyn Museum Quarterly

"The wilderness and the dry land shall be glad; and the desert shall rejoice, and blossom like a rose" (Isaiah xxxv, 1). Two views of the forty-foot wide Desert Life Group (left half of the group, above, and the right half, below) recently installed in the Brooklyn Museum. Like the Arizona Bird Habitat Group in the American Museum, only on a larger scale, it reveals the desert in the full flower of springtime. The upper photograph shows some of the cacti of the group, the giant saguaro, the smaller bushlike choya (at the left), the bisnaga or barrel cactus (beneath the saguaro), and the low prickly pear (left foreground). The lower photograph shows the five specimens of pronghorn antelope in the group, the sole representatives of a distinctly North American family of ungulates, and recognized as fleeter of foot than any other American mammal

AT THIS time when public attention is turned toward the solution of international problems by agreement between nations we can well look at the international bearings of bird protection. Dr. Joseph Grinnell, of the University of California, has recently devoted an article in the *Scientific Monthly* to this question, pointing out the necessity for

some joint action to protect the migratory birds. Our American golden plover breeds in northern Canada and summers as far south as Argentina, passing through about seven political jurisdictions. The common swallow of England migrates to South Africa, and the knot is a visitor on all the seven seas. A single country, however good its intentions, can do little to protect such travelers; it may only spare the birds for the guns of its less conscientious neighbors. A beginning was made in the direction of international protection by the treaty between the United States and Canada with reference to insectivorous and game birds. It is hoped that the countries which have shown the most consideration for the birds may bring a moral influence to bear in extending an appreciation of the value and necessity of conserving the world's wild life.

THE *Victoria Naturalist* reports that 1,500,000 penguins are annually killed for the sake of their oil, but that in spite of this enormous slaughter the penguin colonies have not decreased. A representative of the Australian Ornithologists' Union has been delegated to investigate the traffic at once; it seems scarcely believable that the penguins can escape extinction under such treatment.

A METHOD of drying lumber, reported to the *Quarterly Journal of Forestry* (London) would seem to be the direct antithesis of our familiar "kiln-drying" by hot air. The temperature of the drying shed is reduced by means of a refrigerating apparatus in one end of the shed to such an extent that the moisture of the air is condensed as hoarfrost and the air kept continually dry. In this way all moisture given off by the lumber is immediately disposed of and the lumber dries without the danger of the cracking and checking which accompanies hot-air drying.

THE more than ordinary fertility of ground which has been plowed and harrowed by shell fire has suggested the possibility of using explosives in the operation of tree planting, especially where large areas must be covered quickly as in the rehabilitation of the devastated sectors of France. In a report of experiments to the Académie des Sciences, M. André Piédallu recommends this method for the reason that it loosens up the soil to great depths, supplies nitrates, saves labor, and is much more rapid than digging the holes for the trees.

A COMMISSION appointed by the Biological Board of Canada has submitted a report on the relation of the sea lion to the fishing industry. At the instigation of the fishermen a bounty of $2 a head had been placed on these animals on the ground that they were inimical to the salmon fisheries. It was not entirely ascertained by the commission just what constitutes the main food of the sea lion, but it was satisfactorily shown that the destructiveness was too slight to warrant a general slaughter. The sea lion may be legitimately exploited, as is its cousin the fur seal, for guano, and for leather and oil by taking the young only, and its protection may therefore be urged for commercial reasons. Quite sufficient protection can be given to the fishermen's nets by frightening away these very timid animals.

THE number of fur seals on the Pribilof Islands, according to a census for 1918, is 496,600. The pups born for the season and the breeding cows each numbered 143,005. These figures are exclusive of the 33,881 seals taken during the calendar year, 7000 on St. George Island and 26,881 on St. Paul Island. The catch did not reach the total of 35,000 skins authorized by the Government, but a few seals were likely to be killed from time to time during the remainder of the year as a source of meat supply for the natives. In addition, 386 fur seals were speared from canoes by the Indians on the coast of Washington, as reported by the superintendent and physician of the United States Indian Service at Neah Bay. The Canadian and Japanese governments each are entitled to 15 per cent of the year's take of skins, in compliance with the terms of the North Pacific Sealing Convention of July 7, 1911, the market value of this amount being credited to the respective governments to offset certain advance payments made to them by the United States. Work on the new by-products plant for St. Paul Island, designed for the manufacture of oil and fertilizer from seal carcasses, was pushed rapidly in order that the carcasses of seals killed on the island in 1918 might be utilized in the preliminary operations.

"ANTICLINES in the Southern Part of the Big Horn Basin, Wyoming," is the subject of a report dealing with the oil fields of Wyoming, lately issued as *Bulletin* 656 of the United States Geological Survey. Anticlines, those folds of the earth's crust which cause the strata to dip in opposite directions, lie in a broad belt around the border of the Big Horn Basin and are almost certain indications of the presence of oil. According to the authors of the report, those anticlines lying nearest the central trough of the basin offer the greatest prospect for successful drilling, while those separated from the central trough by other anticlines show scarcely a trace of oil. Oil was discovered in the basin as early as 1888, but no great attempt was made to produce it until 1906, and it was not until 1914 that the largest wells were opened. Since that time, however, the output has increased from 3,560,375 to 6,234,-137 barrels, obtained largely from the Grass Creek, Elk Basin, Greybull, and Torchlight fields. As nine anticlines adjacent to the central trough remain untested, other productive oil fields may yet be discovered.

VOLUME VI of *Fossil Vertebrates in The American Museum of Natural History* has just appeared from the department of vertebrate palæontology of this institution. It includes contributions 168–192, which appeared during the years 1915–17 inclusive, from the studies of Messrs. Osborn, Matthew, Brown, Granger, Gregory, Mook, Anthony, Watson, and von Huene. These articles are collected from the *Museum Bulletin* volumes of the corresponding years. The edition is limited to sixty and is distributed to the principal research centers in this country and abroad.

DR. E. W. GUDGER, of the State Normal College at Greensboro, North Carolina, spent several months in 1918 at the American Museum working on the bibliography of fishes, which is in preparation by the department of ichthyology. Methods of fishing practiced in the South Seas, including the use of vegetable poisons and other primitive devices, were among the points of chief interest in his research.

DR. WILLIAM K. GREGORY, associate in palæontology in the American Museum, was recently elected a corresponding member of the Zoölogical Society of London.

AT the meeting of the Entomological Society of America held in Baltimore in December Dr. Frank E. Lutz, associate curator of invertebrate zoölogy in the American Museum, was elected a member of the executive committee.

SINCE the last issue of the JOURNAL the following persons have been elected members of the American Museum:

Life Members, MESSRS. SIDNEY A. KIRKMAN, R. E. SEAMANS, and PAUL WATKINS.

Sustaining Members, MRS. JAMES MCLEAN and MR. A. MCEWEN.

Annual Members, MESDAMES MAURICE W. KOZMINSKI, CHARLES J. LIEBMANN, ANNIE TRUMBULL SLOSSON, HARRIET WEIL, MISSES KATHARINE N. RHOADES, DOROTHEA B. SMITH, HENRIETTE STRAUSS, MARION WILKINSON, MAJOR GARRARD COMLY, THE REV. DR. ARTHUR H. JUDGE, DOCTORS ABRAHAM HEYMAN, PHILIP HOROWITZ, LEO KESSEL, JOKICHI TAKAMINE, MESSRS. WILLIAM EDWIN ALLAUN, D. ELLIS HAMBURGER, A. C. JENKINS, HENRY W. KENNEDY, JOHN E. LEIKAUF, WILLIAM MENKE, HENRY MIELKE, LAURENT OPPENHEIM, F. A. PARK, WALTER PFORZHEIMER, LIVINGSTON RUTHERFORD, and HENRY STEMME.

Associate Members, MESDAMES EVERARD APPLETON, HUMPHREY BIRGE, MISSES ELEANOR J. CHADEAYNE, HELEN A. ILER, THE REV. GEORGE A. THAYER, DOCTORS MAX C. BREUER, ROBERT H. ELLIS, CURTISS GINN, GEORGE M. HORTON, J. C. OLIVER, JOHN F. STEPHAN, MESSRS. CHAS. E. ADAMS, JOSEPH A. ARCHBALD, CHARLES K. ARTER, LELAND G. BANNING, FRANK W. COMMONS, EDWARD COOKINGHAM, WILLIAM G. CROCKER, HARRY TREVOR DRAKE, W. M. DUNCAN, J. MCF. EATON, LOUIS MCLANE FISHER, WILLIAM HUNTINGTON FOBES, EDWARD I. GARRETT, LOUIS W. HILL, EVAN HOLLISTER, JR., H. E. HOLMES, CHARLES R. HUNTLEY, RICHARD N. JACKSON, JOHN G. JENNINGS, CLARENCE H. JOHNSTON, WILLIAM B. KIRKHAM, HUGO A. KOEHLER, F. W. LEADBETTER, A. L. LOWRIE, JAMES R. MACCOLL, ELBERT B. MANN, DONALD MCBRIDE, AMOS B. MCNAIRY, CHARLES NAGEL, O. E. OVERBECK, EDWARD S. PAGE, WM. P. PALMER, H. E. PARTRIDGE, CHARLES L. SOMMERS, FRANKLIN D. L. STOWE, CARLETON B. SWIFT, and MASTER BENJAMIN PATTERSON BOLE, JR.

The American Museum of Natural History

Its Work, Membership, and Publications

The American Museum of Natural History was founded and incorporated in 1869 for the purpose of establishing a Museum and Library of Natural History; of encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects, and to that end, of furnishing popular instruction.

The Museum building is erected and largely maintained by New York City, funds derived from issues of corporate stock providing for the construction of sections from time to time and also for cases, while an annual appropriation is made for heating, lighting, the repair of the building and its general care and supervision.

The Museum is open free to the public every day in the year; on week days from 9 A.M. to 5 P.M., on Sundays from 1 to 5 P.M.

The Museum not only maintains exhibits in anthropology and natural history, including the famous habitat groups, designed especially to interest and instruct the public, but also its library of 70,000 volumes on natural history, ethnology and travel is used by the public as a reference library.

The educational work of the Museum is carried on also by numerous lectures to children, special series of lectures to the blind, provided for by the Thorne Memorial Fund, and the issue to public schools of collections and lantern slides illustrating various branches of nature study. There are in addition special series of evening lectures for Members in the fall and spring of each year, and on Saturday mornings lectures for the children of Members. Among those who have appeared in these lecture courses are Admiral Peary, Dean Worcester, Sir John Murray, Vilhjálmur Stefánsson, the Prince of Monaco, and Theodore Roosevelt. The following are the statistics for the year 1918:

Attendance in Exhibition Halls	627,302
Attendance at Lectures	64,036
Lantern Slides Sent out for Use in Schools	72,287
School Children Reached by Nature Study Collections	817,610

Membership

For the purchase or collection of specimens and their preparation, for research, publication, and additions to the library, the Museum is dependent on its endowment fund and its friends. The latter contribute either by direct subscriptions or through the fund derived from the dues of Members, and this Membership Fund is of particular importance from the fact that it may be devoted to such purposes as the Trustees may deem most important, including the publication of NATURAL HISTORY. There are now more than four thousand Members of the Museum who are contributing to this work. If you believe that the Museum is doing a useful service to science and to education, the Trustees invite you to lend your support by becoming a Member.